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ELECTRIC DISTRIBUTION STANDARDS IN SAN DIEGO.

BY L. M. KLAUBER.

HISTORY OF ELECTRIC TRANSMISSION.

BY G. O. WILSON.

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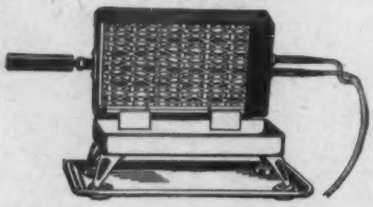

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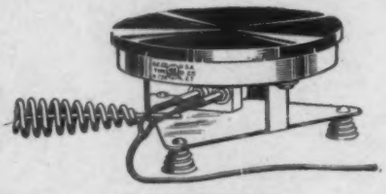

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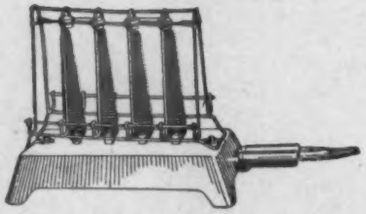

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ELECTRIC DISTRIBUTION STANDARDS IN SAN DIEGO

BY L. M. KLAUBER.

(This initial number of a series of articles on the subject of standards for electric distribution introduces and explains the subject and shows the details of the line numbering system employed by the San Diego Consolidated Gas & Electric Company, for which Mr. Klauber is superintendent of the electric department.—The Editor.)

Introduction.

This series of articles consists of extracts and sketches derived from an "Electric Distribution System Pocket Book" issued by the San Diego Consolidated Gas & Electric Company for the use of the employes engaged in the construction or operation of its distribution system.

The San Diego Consolidated Gas & Electric Company, of which H. M. Byllesby & Company of Chicago are the engineers and managers, serves the city of San Diego and contiguous territory. This company, under the efficient management and energetic new business policy of the Chicago firm, has sustained a rapid growth during the past few years; its distribution system has grown from a small plant serving only the central part of San Diego, to one which covers thoroughly the southwestern part of San Diego county, and serves therein some twenty-nine towns and villages. The accompanying map shows the district covered by the electric distribution system.

Map of Distribution System of San Diego Cons. Gas & Electric Company.

The "Electric Distribution Pocket Book" was originally devised for the purpose of standardizing materials and methods of construction, particularly those details not covered in the 1911 report of the Committee on Overhead Line Construction of the National Electric Light Association, and other matters having local application only.

While this book has entailed considerable expense in the making, it is believed that it will prove a profitable investment in reducing operating expenses and enhancing economical and uniform construction. It forms a permanent method of advising construction foremen of new systems, routine, or laws, as for instance, the method of numbering lines as outlined in Section A or the extracts from the California state law on Line Construction in D 93.1 The larger portion of the book has been in use for about eighteen months.

In this book it has been the intention to avoid all matters of theoretical interest only, and to consider practical construction details, and only those having definite bearing on the system of the San Diego Consolidated Gas & Electric Company. Necessarily but little matter contained in the book is new; it is merely the grouping from several sources, of material of value to the line foreman, inspectors, estimators and trouble men, to whom it is issued.

In the present article much matter of purely local interest will be omitted except for such notes as might be of assistance to other companies desiring to make similar records. Also at various points brief explanations will be inserted to cover methods which, while clear to those familiar with the distribution system of the San Diego company, might be obscure to those unacquainted with it. Naturally in the preparation of this book for the employes of the company a certain familiarity with the local system and procedure was assumed.

A few words on the distribution systems employed may serve to define the scope of the pocket book. The San Diego Consolidated Gas & Electric Company has a single centrally situated steam plant, having a rated capacity of 8470 kw. (now being increased to 12470 kw.) Current is generated at 2300 volts, 3-phase, 60 cycles and is distributed throughout most of the city

at this voltage. The lighting feeders are run single-phase from the power plant and, for the maintenance of better voltage control, are segregated from the three-phase power feeders. The suburban districts are covered by three-phase 11,000 volt lines issuing from step up transformers located at the central station. Among these lines are installed small step down transformer banks reducing the voltage to 440 or 220-110 for isolated power or lighting consumers, or to 2300 volts for re-distribution to scattered districts. There are likewise the usual series arc and incandescent circuits for municipal lighting, a 500 volt direct current circuit for elevator service and a limited 220-110 volt direct current system in the central district. Distribution in the business district is underground.

General Description of the Book.

The book as issued to the employes is an I. P. loose-leaf binder, size 504, containing twelve celluloid tip index sheets and about 300 blue-printed pages, each 6¾x3¾ in. A thin grade of blue print paper is used in order to get this many sheets in the book.

The treatment consists of the following points and divisions:

Index.

A	Line Numbering,	G	Motors.
B	Pole Spacing.	H	Meters.
C	Standard Material	I	Miscellaneous.
D	Construction Details.	J	Underground Construction.
E	Transformers.		
F	Street Lighting.	K	Underground Maps.

Under index in the pocket book furnished the construction foreman there are filed sheets covering the indices of all the groups; these sheets are duplicated one at a time behind the individual tab sheets. Therefore, if it is desired to find the group in which a sheet falls it is customary to consult the general index at the book; if the group be known but not the sheet number, the index sheet immediately back to the tab sheet in each group may be more easily located.

The method of indexing used is a modified decimal system, permitting of indefinite expansion. The sheet number to which reference is made when mentioning these sheets in this article is that appearing in the lower right hand corner. The small number in the lower right hand corner is the number of the standard tracing which comprises the original, of which, of course, the sheet appearing in the book is only the central part. The number along the left hand edge is the correction number by which it can be quickly told which of two sheets is the later edition.

As new sheets are drawn or revisions completed they are forwarded to the owners of books with the understanding that they are to be inserted in numerical order, or if revisions, the old sheets are to be replaced.

The books as issued to the line foreman are not always complete; for instance, those foremen who never deal with the underground system or with meters do not receive the sections covering these matters.

Section A: Line Numbering.

This section is subdivided as follows:

A 10 Numbers of Present Lines.
A 20 Method of Stencilling.
A 30 Method of Numbering Lines.
A 40 Method of Lettering Secondaries.
A 50 Method of Numbering Transformers.
A 60 Method of Numbering 11,000 Volt Switches.

A 10: Numbers of Present Lines. This division contains a tabulation on eight sheets of the numbers which have been assigned to the circuits in each district served by the company. These have been subdivided as to single-phase, three-phase, municipal arc and incandescent, 11,000 volt, 2300 volt lines feeding from high tension lines, and special circuits. These tabulations being of local interest only are not given here.

A 20: Method of Stencilling. The division contains general instructions as follows:

Corner Poles.—Stencil every wire on corner poles on that side of the cross arm which faces the street or alley.

Transformer Stations.—Stencil every wire on poles occupied by transformer stations. When installing a new station on an old pole, stencil every wire on that pole. Stencil on the transformer side of the cross arm. Stencil the transformer station number on the lowest cross arm to which the transformer is attached and on the side on which the transformer is hung.

Colors.—Stencil in black paint on yellow arms and white paint on green arms.

High Line.—Stencil the 11,000 volt lines at every switch pole and transposition pole. On long straight runs in the country stencil every 1500 feet.

Phase Letter.—11,000 volt lines should always be stenciled with phase letter, as for instance 75A, 75B, 75C. Omit phase letter when stencilling 2300 volt lines.

Size of Stencils.—Standard 2½ in. stencils should be used for all stencilling on cross arms.

A 30: Method of Numbering Lines. This section was devised more for the use of estimators and those issuing work orders than for line foremen. Although the system seems complicated, it has now been in use over two years and has proved efficient. The numbering of new transformer stations or lines is solved almost automatically. The information on this subject contained in the Pocket Book follows:

Transformer Station and Circuit Numbering Systems.

Single phase 2300 volt circuits taken directly from the power plant buses take numbers 1 to 19 inclusive. Stations on such lines take numbers of which the first one or two figures indicate the circuit number, and the last two figures indicate the serial number of the station. Examples: Stations on circuit 13 are numbered 1301, 1302, etc. Stations on Circuit 7 are numbered 701, 702, etc.

Three-phase 2300 volt circuits taken directly from the power plant buses take numbers 20 to 39 inclusive. Stations on such lines take numbers of which the first two figures indicate the circuit number, and the last two figures indicate the serial number of the station. Example: Stations on circuit 24 are numbered 2401, 2402, etc.

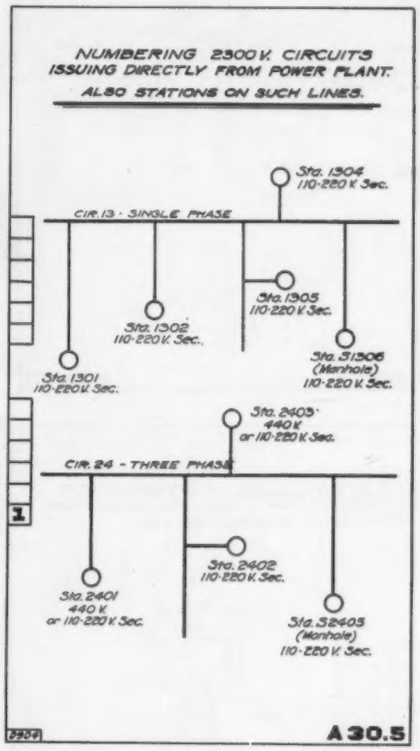
Series arc circuits issuing from the power plant are assigned numbers 40 to 59 inclusive, Transformer stations on such circuits are given four figure num-

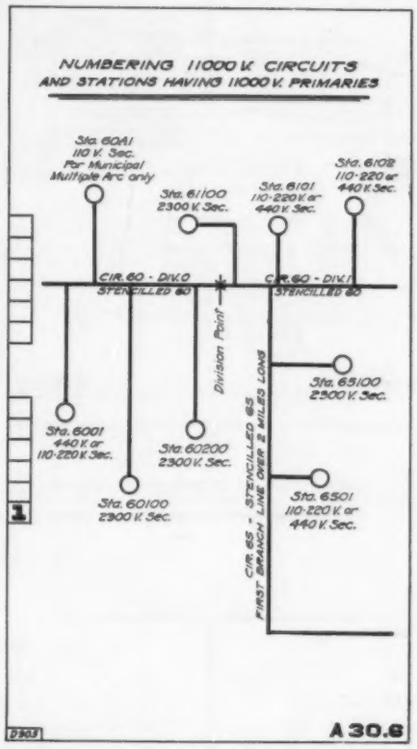
bers, of which the first two numbers indicate the circuit number and the third number indicates the serial number of the station. The fourth number is invariably 0. The secondary line issuing from such a station takes the same number as the station, with the 0 omitted. Example: Stations on arc circuit 41 are numbered 4110, 4120, etc. The secondary line from station 4110 is stencilled 411.

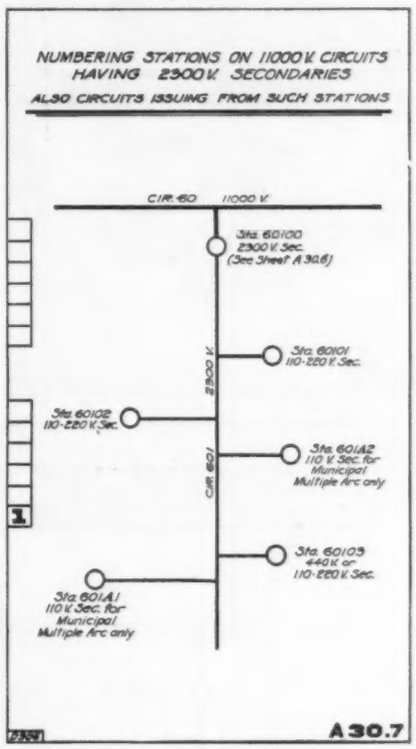
11,000 volt circuits issuing directly from the power plant are given the numbers 60, 70, 80, 90, 100, 110, etc., as required. Each main line is divided into divisions, as for instance: Line 60, division 0; line 60, division 1, etc. The division number is not stencilled on the cross arm; it affects only the station numbers connected on the line. No line will have more than 5 divisions; that is, the last division in line 60 is division 4. Branch lines over two miles in length are given individual numbers of which the first figure is the same as that of the main line from which the branch is taken, and the second is the serial number of the branch. The lowest branch number is 5. Example: Branches from line 60 are numbered 65, 66, etc. Branches less than two miles in length take the same number as the main line.

Stations on 11,000 volt lines stepping down to 440 or 110-220 volt secondaries have four figure numbers, of which the first two indicate the number of the 11,000 volt circuit and the last two the serial number of the station. Examples: Stations on line 60, division 0 are numbered 6001, 6002, etc. Stations on line 60, division 1 are numbered 6101, 6102, etc. Stations on branch line 65 are numbered 6501, 6502, etc. It will be noted that as far as station numbering is concerned line 60, division 1 may really be considered line 61, etc.

Stations on 11,000 volt lines stepping down to 2300 volts have five figure numbers of which the first two are chosen as in the case above. The third figure represents the serial number of the station and the last two figures are invariably zeros. Examples: Stations of this type on line 60, division 0, are numbered 60100, 60200, etc. Stations on line 60, division 1 (equivalent to line 61) are numbered 61100, 61200, etc. Stations on line 65 are numbered 65100, 65200, etc. The 2300 volt primary lines issuing from such stations take the numbers found by dropping the last two ciphers—as, primary line issuing from station 60100 is numbered 601, etc. 2300 to 110-220 volt stations on such primary lines have five figure numbers of





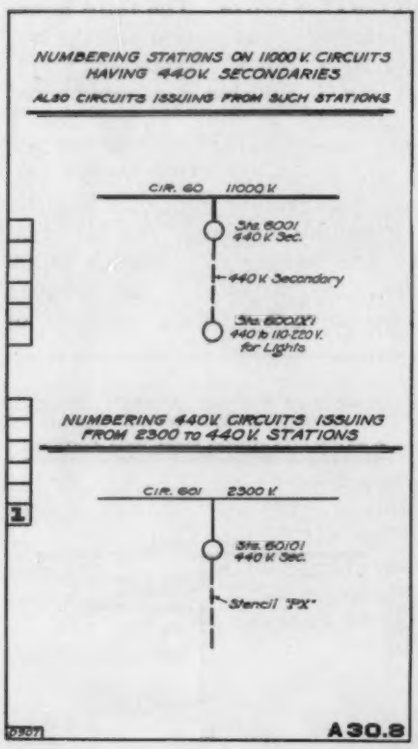


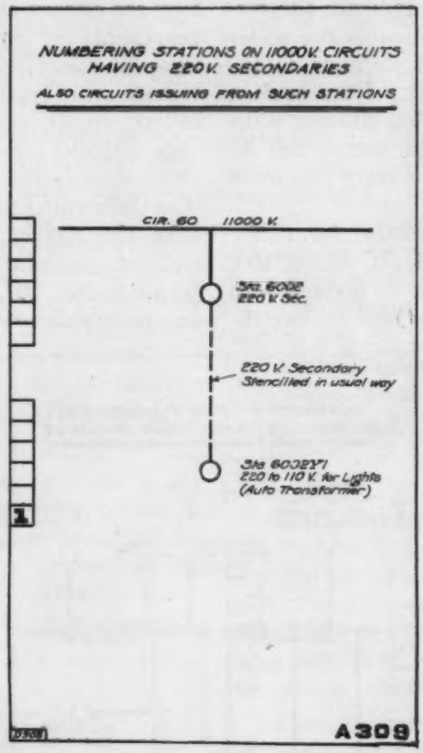
which the first three figures give the circuit number and the last two figures the serial number of the station. Example: Stations on line 601 are numbered 60101, 60102, etc.

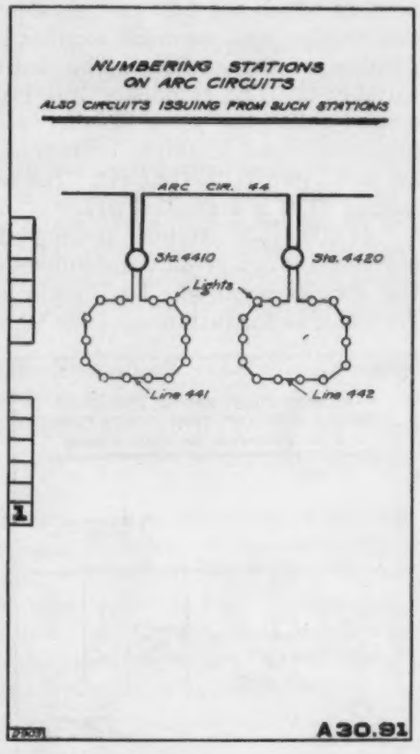
Municipal multiple arc stations such as are used in scattered suburban districts carry municipal arcs exclusively due to the fact that they are cut out on the primary side during the day time by means of a primary switch wire. Such stations take numbers in which appears the letter "A." The numbers preceding "A" give the line number and the numbers following "A" the serial number of the station. Examples: Multiple arc stations on line 601 are numbered 601A1, 601A2, . . . 601A10, 601A11, etc. If the arc were connected to a 11000-110 volt station on line 65 the station would be 65A1.

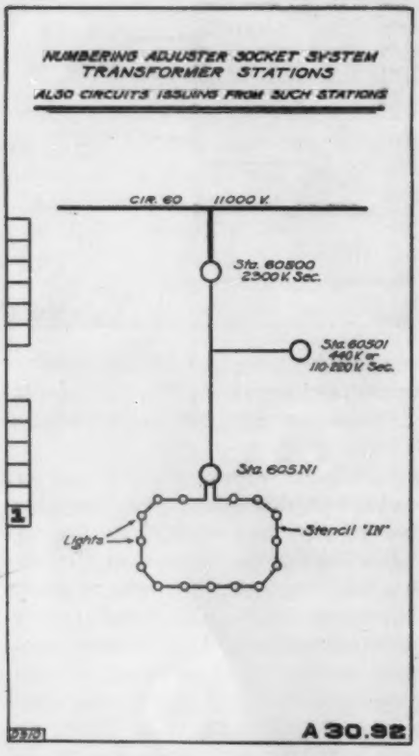
2300 volt primary switch wires are stencilled "L." Secondary wires issuing from multiple arc stations are stencilled "SL." Where two or more primary switch wires are necessary in the same town owing to the desirability of balancing the arc load on a three-phase system, they are stencilled L1, L2, etc.

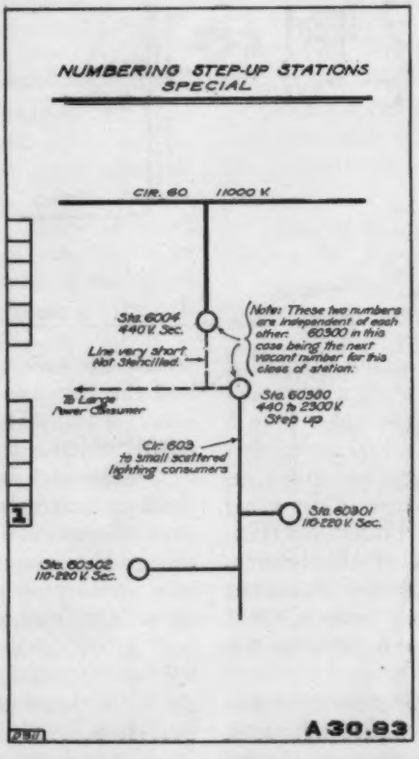
In adjuster socket systems for series incandescents the station takes a number in which appears the letter "N." Examples: Adjuster socket stations on line

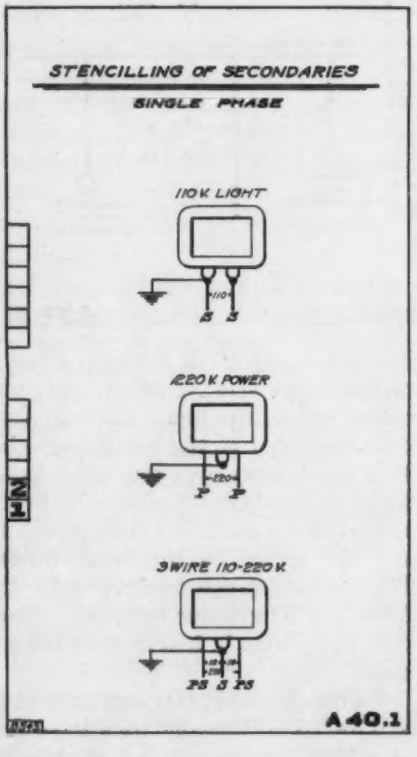

NUMBERING STATIONS ON 11000 V. CIRCUITS HAVING 440 V. SECONDARIES
ALSO CIRCUITS ISSUING FROM SUCH STATIONS
CIR. 60 11000 V.
Sta. 6001 440 V. Sec.
440 V. Secondary
Sta. 6001X1 440 to 110-220 V. for Lights
NUMBERING 440 V. CIRCUITS ISSUING FROM 2300 TO 440 V. STATIONS
CIR. 601 2300 V.
Sta. 60101 440 V. Sec.
Stencil "PX"
A 30.8


NUMBERING STATIONS ON 11000 V. CIRCUITS HAVING 220 V. SECONDARIES
ALSO CIRCUITS ISSUING FROM SUCH STATIONS
CIR. 60 11000 V.
Sta. 6002 220 V. Sec.
220 V. Secondary Stencilled in usual way
Sta. 60032Y1 220 to 110 V. for Lights (Auto Transformer)
A 30.9




NUMBERING ADJUSTER SOCKET SYSTEM TRANSFORMER STATIONS
ALSO CIRCUITS ISSUING FROM SUCH STATIONS
CIR. 60 11000 V.
Sta. 60500 2300 V. Sec.
Sta. 60501 440 V. or 110-220 V. Sec.
Sta. 605N1
Lights
Stencil "IN"
A 30.92

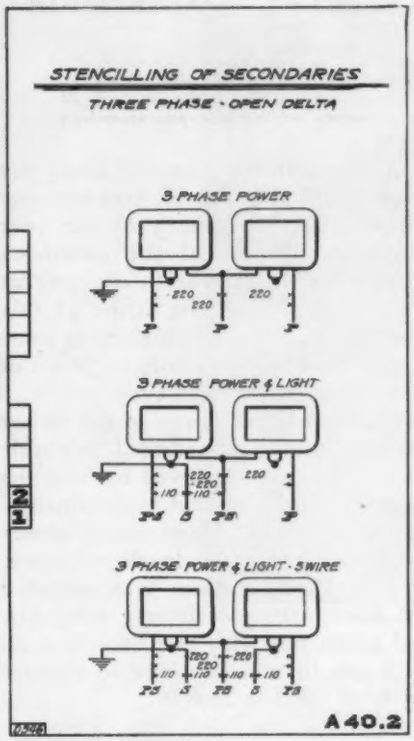

NUMBERING STEP-UP STATIONS SPECIAL
CIR. 60 11000 V.
Sta. 6004 440 V. Sec.
Line very short. Not Stencilled.
(Note: These two numbers are independent of each other. 60300 in this case being the next vacant number for this class of station.
To Large Power Consumer
Sta. 60300 440 to 2300 V. Step up
Cir. 603 to small scattered lighting consumers
Sta. 60301 110-220 V. Sec.
Sta. 60302 110-220 V. Sec.
A 30.93

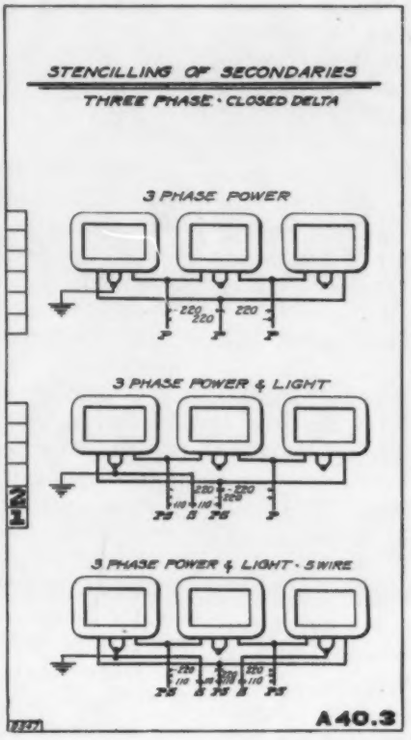


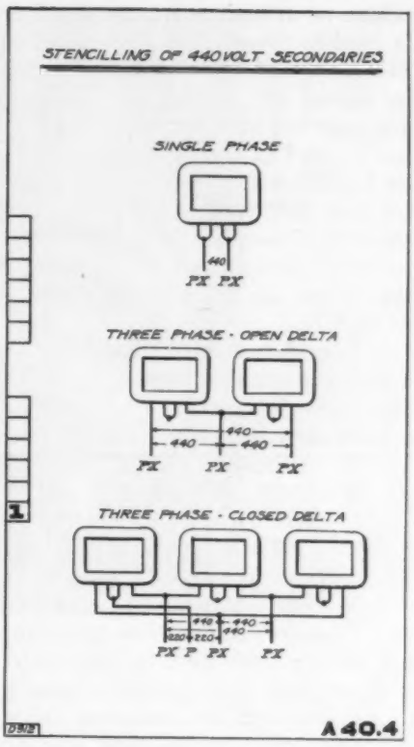
601 are numbered 601N1, 601N2, etc. Secondaries from such stations are stencilled "IN."

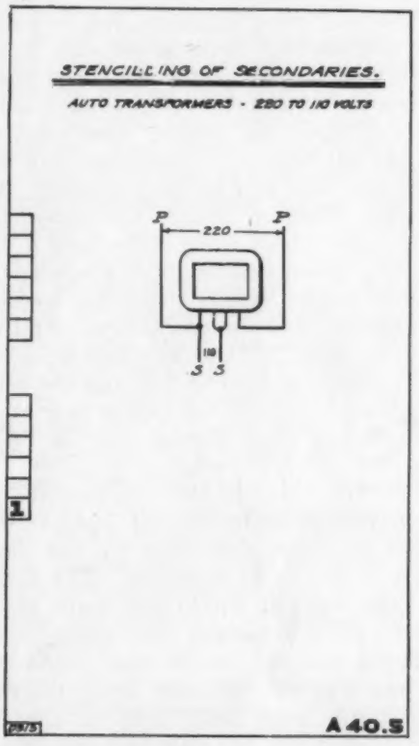
Stations having low voltage primaries. In the farming districts it is sometimes necessary to step down from 440 volts to 110 for lights and even occasionally (by means of an auto transformer) from 220 to 110. Such stations are given numbers containing the letter "X" (or "Y" in the case of 220 volt primaries) in which the numbers preceding the "X" indicate the station from which the 440 (or 220) originates and the numbers following indicate the serial number of the station. Examples: 440 volt stations on 440 volt line issuing from station 6001 are numbered 6001X1, 6001X2, etc.

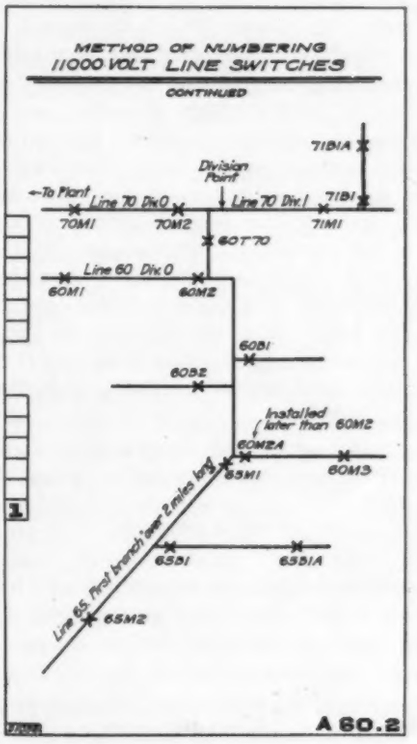
Step up stations are occasionally used where there is a large power consumer for whom current is stepped down from 11,000 to 440 or 220 and where there is also a small scattered lighting load necessitating a 2300 volt distribution system. In this case a small station is installed stepping up from 220 or 440 to











2300 volts. This step up station is given a number independent of the step down station just as if a 11,000 to 2300 volt step down station were actually installed.

Direct Current Circuits.—500 d.c. circuit is numbered 500; 110-220 d.c. circuit is numbered "D.C."

Phase Letters.—Phase letters to assist in following wires through transpositions, etc., are used on 11,000 volt lines only. The letters used are A, B and C, and are stencilled under each wire, following the line number. Example: On line 60 the wires are stencilled 60A, 60B and 60C.

Subway Stations.—Transformer stations located in manholes are given the prefix S. Examples: S1315, S2461, etc. Otherwise the station numbers are chosen the same as for overhead stations.

Booster Stations.—Where transformers are used as series boosters the letter B is prefixed to the station number.

2200 Volt Motors.—In the case of 2200 volt motors

where no transformers are required a station number is used to cover the motor installation, as for instance, M2516 would represent service to a 2200 volt motor on circuit 25. Where two or more 2200 volt motors are installed at the same place only one station number is used as this represents a single service. Where an 11,000 to 2200 volt station is installed to give service to a 2200 volt motor from an 11,000 volt line, give the step down station a characteristic number ending in two ciphers (as for instance 65,500) and consider the motor as the first line station (as for instance M 65,501).

Transformers.—Transformers are numbered consecutively without regard to size or type. However the following prefixes are used to denote general groups into which transformers fall:

N—Adjuster socket system transformers.
H—11,000 volt primary.
L—Series arc transformers, type SL.
P—2200 volt primary, 9 to 1 ratio only.
S—Subway.
X—440 volt primary.

Transformers without prefix letters are transformers having 2080, 2200 or 2400 volt primaries, with or without taps, and the main ratio is 10 to 1.

11,000 volt line switches are given 4 or 5 figure numbers of which the first two figures give the line number. Following this there is a letter giving the class of switch (M=main line; B=branch line; T=tie), after which is placed the serial number of the switch, numbering out toward the end of the line. If a branch line is long enough (2 miles, see Sheet A30.1) to receive a separate number, any switch in this branch line is considered a main line switch. If there are two or more switches on the same branch less than 2 miles long, the second switch receives a suffix letter, as for instance: First switch, 65B1, second switch, 65B1A. If a new switch is installed between two old switches in a main line the new switch is given a suffix letter, but the numbers of the original switches are not changed. For instance, if a new switch is installed between 60M2 and 60M3, the new switch is called 60M2A.

The accompanying cuts show graphical examples of these numbering systems to illustrate more clearly the methods used.

[To be continued.]

The international electrical exposition which Spain planned to hold at Barcelona next year has been postponed to 1917 and will be broadened in its scope.

Under-water talk between forts is being provided by the U. S. Signal Corps, which is laying a submarine cable in Puget Sound to establish communication between the various fortifications that guard the approach to Seattle. Three forts are to be connected so that there will be three legs to the submarine telephone system. Seventeen miles of 20-pair No. 19 B. & S. gauge paper insulated submarine telephone cable will be required for this work. The Western Electric Company has shipped it in seventeen lengths of one mile each, one mile of cable to a reel and two reels to a flat car.

HISTORY OF ELECTRIC TRANSMISSION

BY G. O. WILSON.

[Concluded.]

(In this concluding installment the author marks the milestones which have defined the history of high tension transmission during the past fourteen years.—The Editor.)

We have thus followed in considerable detail the history of the development of power transmission throughout the world, from its infancy to the year 1900. To describe in similar detail the enormous growth of the industry from that year to the present day would be a work far beyond the scope of this paper. In order, however, to make this history in some measure complete, an effort will be made to pick out the milestones of progress during this time.

In England, the concentrated nature of the power market, together with the well distributed available water supplies and coal fields, has served to hold the voltage down, in spite of the fact that governmental restrictions were removed in 1902, and many power houses of large capacity have been developed since. In 1912 a 100,000 volt Thury system was installed for the purpose of transmitting relatively long distances from the coal fields, but with this exception all the large plants in England still continue to operate at voltages ranging from 6000 to 20,000.

In the rest of the world, the most notable characteristic of the development of the industry has been the growth of great networks, fed by a number of stations, and serving large areas with power. In this growth the United States has been the leader, and with few exceptions the first steps toward longer lines, higher voltages, and greater connected power in the networks have been in California. We have today, in the Pacific Gas & Electric Company, together with the Great Western Power Company, to which the former concern can connect its lines in case of emergency, the greatest network in the world, with a total available power supply from all hydroelectric and steam plants, of about 200,000 kw. And we also have, in the 250 mile, 150,000 volt line from Big Creek to Los Angeles, the longest line and the highest voltage in the world, two of the power houses of this great project having been started early in 1914, with a capacity of 35,000 kw. each.

The rapid rise in the commercial limit of transmission voltage in the decade from 1890 to 1900 was checked at about that time by the development of the art of insulator building. The first step above the 40,000 volts at Provo was made by the Missouri River Power Company in 1902, when they placed their double pole line to Butte in commission at 50,000 volts. This line was only 65 miles long, the record for distance at this time being held by the Bay Counties Power Company's 140 mile line from the Yuba River to Oakland, California, operated at 40,000 volts. The next step was to 60,000 volts, on the 100 mile line at Guanojuato, Mexico, completed in 1904; and later in the same year, 66,000 volts was used on the longest line in the world, 232 miles from De Sabla to Sausalito. This figure was not raised until the end of 1906, when the 75 mile line from Muskegon to Grand Rapids, Michigan, was successfully placed in commission at 72,000 volts. In the latter part of 1908 the line from Croton Dam to Grand Rapids was started at 110,000

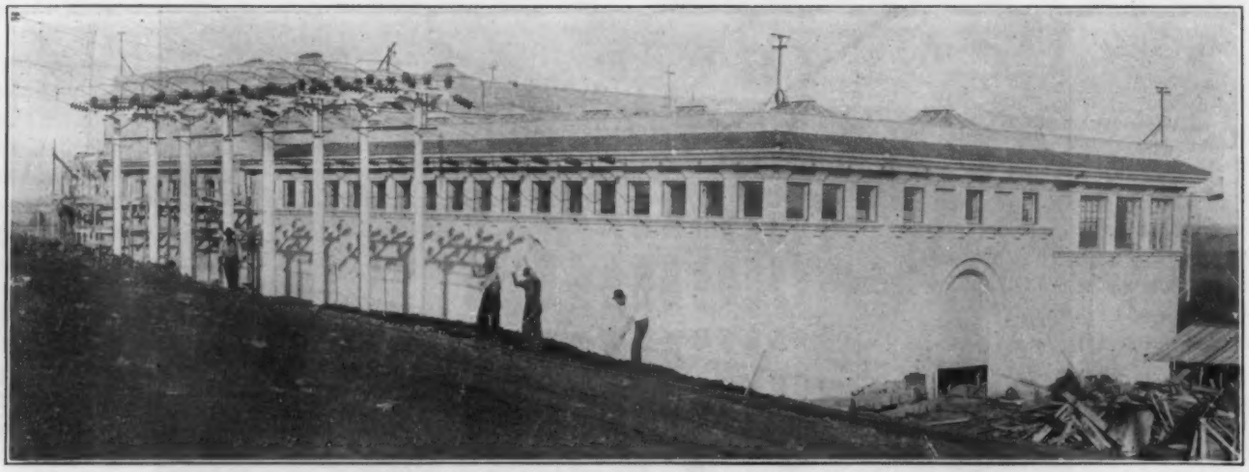
Big Creek Power House of Pacific Light & Power Co.

volts, and early in 1912 the 225 mile line from Au Sable to Flint, Michigan, again claimed the record with 140,000 volts.

This progress of the maximum voltage in America has been far in advance of European practice. The first 30,000 volt line on the continent was from Hochfeld to Clattfelden, in Germany, started in 1901. It was not until 1905 that this pressure was exceeded by the 112 mile line from Moutiers to Lyons, France, which was operated at a voltage of 57,600. This was, however, a direct current line; the highest alternating voltage in Europe at this time was on the line from Cellina to Venice, where 36,000 volts was used. In the latter part of the following year a 40,000 volt line was placed in operation between Cromo and Nembro, in Italy; and before the end of 1907 there were two 50,000 volt lines, one in Germany, and the other in Norway. It was not until 1910 that this pressure was exceeded, the 150 mile line from Molinar to Madrid being operated at a pressure of 70,000 volts early in this year. Before the end of the same year, the 112 mile line from Abruzzi to Naples was placed in commission at 88,000 volts, and the Lauchkammer Steel Company in Germany began transmitting 20,000 kw. 35 miles from their coal fields at 110,000 volts. This line has remained the highest voltage in Europe to the present.

In the extent and capacity of networks, the leadership of the United States over European practice has not been so marked, although the Niagara system, as well as the Pacific Gas & Electric network on the Pacific Coast, are far greater than anything yet constructed in Europe. At Niagara, the capacity of the Niagara Falls Power Company has been increased to 105,000 h.p. thus utilizing the full capacity of the tunnel; and the capacity of the plant in the gorge was increased to 33,000 h.p. in 1905, and to 56,000 h.p. in 1909. The Canadian plant of the Ontario Power Company had 58,000 h.p. installed in 1909, and has at present a capacity of over 100,000 h.p. feeding two of the longest lines east of the Rockies—one 160 miles to Syracuse, and the other transmitting 40,000 kw. 90 miles to Ontario at 110,000 volts. On the Pacific Coast, in addition to the great network of the Pacific Gas & Electric Company and the Great Western Power Company, mentioned above, there is still another important line in Central California, that of the Sierra & San Francisco Power Company, transmitting 20,000 kw. 134 miles from the Stanislaus River to San Francisco. In Southern California three power companies have built up a great network centering at Los Angeles, having an aggregate capacity of over 50,000 kw., not including the great new plant at Big Creek, or the proposed aqueduct system. The Southern Sierras Power Company also is transmitting power at 140,000 volts, 238 miles from Bishop Creek to San Bernardino. Northern California also has a large network, the total capacity of the Northern California Power Company being 47,000 h.p. In the Northwest, the Snoqualamie Falls power house has a capacity of 20,000 kw., this power being supplied to Seattle, Tacoma and Everett, in Washington. These cities also receive 15,000 kw. from the Puyallup River. The Washington Water Power Company transmits 22,000 kw. 100 miles from Little Falls to Wallace in Idaho. In the Rocky Mountain district, the greatest network is that of the Great Falls Power Company, in Montana, having a total capacity of 72,000 kw., and a maximum distance of transmission of 150 miles. The original Telluride Power Company in Utah has a 30,000 kw. network centering at Salt Lake, and the Central Colorado Power Company has a 15,000 kw. network centering at Denver, this last being located at the greatest elevation of any large power system in the world, and crossing the continental divide three times.

In the Eastern part of the United States, in addition to the great Niagara plant, many large networks have grown up. At Keokuk, Iowa, is the largest plant in the world with an installed capacity of 150,000 h.p. 90,000 kw. of which is transmitted 140 miles to St. Louis. The Southern Power Company, with 150 miles



Cordelia Substation of Pacific Gas & Electric Co.

of lines in the great cotton belt in North and South Carolina, has a total capacity of 75,000 kw. in a 110,000 volt network. A southern network of almost equal size is that of the Central Georgia Power Company, having a capacity of 60,000 kw. and a maximum distance of transmission of 170 miles, also at 110,000 volts.

In Canada, in addition to the great Canadian Niagara power house, the largest power scheme is that at Shawinigan Falls, transmitting 40,000 kw. 85 miles to Montreal at 100,000 volts. In Mexico, the 171 mile, 60,000 volt line transmitting 30,000 kw. from Mecasa to the City of Mexico and the El Oro mines is the greatest power project of the present day. In South America, the extremely humid character of the atmosphere has kept the voltage, and consequently the length of transmissions considerably lower than in the United States or Europe. A 20,000 h.p. plant transmitting 21 miles at 24,000 volts was placed in operation in Brazil in 1901. In 1908, 9000 kw. was installed on the Piabanka River and transmitted 50 miles at 44,000 volts. In the following year this plant was enlarged to a capacity of 30,000 kw., and the voltage of transmission was increased to 88,000, thus making it the greatest plant in South America, which position it still holds.

In Europe, Italy and France have led the way in the building of great networks. In 1906 Italy had the greatest system in Europe, 83,000 h.p. being connected to the lines supplying Genoa. In the same year the direct current supply to Lyons mentioned above, was supplemented with a 115 mile alternating current network having a total capacity of 31,000 h.p. which was increased to 45,000 h.p. in 1910. The years following 1906 saw the growth of the greatest system in Europe in Southern France; by 1909 this network contained 600 miles of lines, connected to 19 different stations of an aggregate capacity of 91,800 kw. This remains the greatest network in Europe, although several systems having capacities from 20,000 to 50,000 kw. have grown up in Italy, Norway, Spain and Switzerland.

The gas industry in the United States represents a capitalization of more than a billion dollars and an annual value of output close to two million dollars. Of the 212,391,168,000 cu. ft. of gas made in 1912, 42.2 per cent was coal gas and 57.8 per cent oil and water gas.

An oil motor ship of 8000 tons and 6000 h.p. has been laid down in the new yard of Barclay Curle & Company at Scotstoun West for the Russian East Asiatic Company, of St. Petersburg who are also considering designs for a motor ship having engines of 36,000 h.p. The St. Petersburg vessel will be twin screw, have a speed of 16 knots, and will be engaged in her owners' service between Libau and New York.

HYDROELECTRIC PLANTS OF JAPAN.

	Location.	Capital, yen.	Trans. V.	Head.	Turbines.	Generators.
Tokyo Electric Light Co.	Tokyo	50,000,000	57,000			
Station No. 1			.....	345 ft.	6-5600 h.p. Escher Wyss	6-3900 k.v.a. Siemens.
Station No. 2			.....	375 ft.	6-12,500 h.p. Escher Wyss	6-7700 k.v.a. A. E. G.
Katsuragawa Electric Power Company	Katsuragawa, 50 miles west of Tokyo	8,000,000	77,000	473 ft.	4-10,000 h.p. Voith	4-7000 k.v.a. G. E.
Kinugawa Hydro-Electric Company	Kinugawa, near Tokyo	13,500,000	66,000	1050 ft.	6-12,500 h.p. Escher Wyss	6-8700 k.v.a. A. E. G.
Inawashiro H. E. P. Co.	Lake Inawashiro, 150 miles north of Tokyo	21,000,000	115,000		6-11,250 h.p Voith	6-7775 k.v.a. Dick Kerr
Sagami H. E. P. Co.	Sagami River, near Tokyo	5,000,000	66,000			
Station No. 1			.....	137 ft.	3-3780 h.p. Bovings.	3-2500 k.v.a. A. S. E.
Station No. 2			.....	83 ft.	3-2350 h.p. Bovings.	3-1500 k.v.a. A. S. E.
Fuji Gas Cotton Spinning Company	Near Hakone		66,000	300 ft.	4-3250 h.p. Escher Wyss	4-2200 k.v.a. Shibaura
Tone Hatsuden Kaisha	Tone River, 60 miles north of Tokyo		66,000	450 ft.	3-9200 h.p. Voith	3-6000 k.v.a. G. E.
Ujigawa H. E. P. Co.	Near Kioto	12,500,000	32,000	205 ft.	6-8000 h.p. Voith	6-5400 k.v.a. A. E. G.
Kyushu E. H. P. Co.	Kuyshu	11,500,000	66,000	235 ft.	5-5600 h.p. Voith	5-3750 k.v.a. G. E.
Nagoya Electric Light Company	Nagoya	16,000,000			10,950 h.p.	
Oji Paper Mill Company	Hokkaido		.....	.....	13,200 h.p.	

EFFICIENT POWER PLANT MANAGEMENT

CORRESPONDENCE FILING CLASSIFICATIONS.

(Through the courtesy of the Pacific Power & Light Company of Portland, Oregon, their system for filing correspondence is here presented. It is believed to be one of the first practical adaptations of the Dewey decimal system of indexing that has been devised for the use of public service corporations. The entire system will be printed in full in succeeding issues, the only change made being the re-arrangement of the preliminary instructions for its use.—The Editor.)

General Description.

This classification is a logical arrangement of the subjects covered by the correspondence of the departments of the Pacific Power & Light Company. In the groups, no recognition has been made of departments, of geographical location or of job numbers.

Each subject is given a number, and each letter relating to that subject is marked and filed under that number. The numbering is an adaptation of the Dewey Decimal System, and permits of indefinite extension. This is an important feature, and one of the most valuable of the system. It is obviously impossible to develop a system so complete but that some addition, extension or subdivision will later be desired.

The classification has been made so comprehensive that all departments may make use of it.

Unless desired otherwise, the letters of all departments may be intermixed with those of other departments, and filed in the same folders. Provision has been made, however, so that any department wishing to isolate its correspondence from all others may do so by prefixing a letter to the regular file number. Each department of the company has therefore been assigned a designating letter, as follows:

G—General Matters.
X—Executive Department.
L—Legal.
R—Right-of-Way & Property Department.
F—Financial Department.
A—Accounting Department.
P—Purchasing Department.
E—Engineering & Construction Department
T—Operating Department.
N—New Business Department.

Any department may avail itself of separate files at any time by using its departmental prefix.

Rules for Filing.

(1) No letters or copies will be received by the filing clerk unless clearly marked in upper right-hand corner with the file number. The original and all copies shall be similarly marked.

(2) Each department shall arrange for the classification and marking of its incoming and outgoing correspondence. It is recommended that this be done by the stenographers receiving the dictation.

(3) The responsibility for correct and accurate classification lies with each department. The filing clerk will file all letters as numbered without questioning the correctness of the number.

(4) In asking for a letter from the files, the file number or numbers should first be determined by the department making the request. The individual who numbered the letters is best qualified to say in what file to look for the sheet in question. It is, therefore, recommended that stenographers be sent in quest of letters from the files, as such procedure will tend to increase the care with which they assign the file numbers in the first place.

The filing clerk should not be called upon to perform this function, but will assist in every way possible when a department has trouble in locating its correspondence. As an aid in this work, a complete alphabetical card index will be maintained up to date at all times in the filing room.

(5) When a letter is wanted, the folder containing the letter, along with others on the same subject, will be handed intact to the department.

A special pink card will be inserted in the filing cabinet in lieu of the folder removed, and on this pink card will be noted the name of the individual receiving the folder and the date it was given out. Upon return of the folder, the pink card will be removed and the date of return placed opposite the individual's name.

(6) ADDITIONS TO THE CLASSIFICATION will from time to time be found desirable and necessary. In all such instances, the departments must take up this matter of assignment of new numbers with the one in charge of this work. It is imperative that no additions be made by any persons except as herein authorized.

(7) The stenographers of each department are requested to have the correspondence of the previous day numbered and ready for collection by 10:00 a. m. All letters will be collected by the filing clerk. No attempt should be made to deliver them to the filing room.

Instruction for Use.

This classification should first be studied carefully and thoroughly so as to obviate errors that generally come up when a system of this kind is first used. No recognition has been made of departments, but recognition has been made of divisions of subjects; that is, all matters pertaining to electricity, electrical equipment and the utilization of electricity are grouped together and this system is followed out with regard to subjects pertaining to gas, water and railways. If one wishes to find the file number for, say, generators, the first place to look would be under the 300 series, not "Material and Supplies" under the 700 series, as that deals with only the miscellaneous material and supplies common with electricity, gas, water or railways, and not specific items.

When one first sees a classification of this kind, he generally throws his hands up in horror after realizing the wide scope of the system as to the number of files, but the one thing to be remembered is that the efficiency of a filing system is improved when "miscellaneous" files are split up into "specific" files, and all repetition of file subjects is eliminated.

A revision of the files is not made, of course, on account of just a few changes. When any new topic or subject arises, it is always closely related to some existing head or sub-division of a heading, and combining it with the nearest head by adding a decimal place makes abundant room for the new comer. The system is thus capable of unlimited expansion and can never break down for lack of room for growth. Remember, though, that no suggested number should be used, or will be allowed, until that particular number is accepted and incorporated in the filing classification and you are notified of such incorporation in the files.

Be careful about the use of file numbers. Whenever a mistake is found in the numbering of letters that come to this office, it will be corrected and you will be advised of the change, and the reasons therefor. If you have doubts as to what file to use on certain letters, why do the best you can and then take the matter up with this office. Do not hesitate at any time to write for information on anything pertaining to the filing of letters or about the file classification itself. It has been in use in Portland for over eight months and only now is it being really understood and appreciated, which appreciation comes, of course, simply because the proper knowledge is being gained about such a filing system.

In starting the use of the system the stenographer receiving the dictation will select the proper file number and place it in the upper right hand corner of the original and all duplicate copies. Only one subject should be covered in any letter. If you cover two or more subjects, it is evident that the letter can be filed under but one, and you will have placed yourself in a position where you may be subject to considerable delay in receiving your copy when you desire it at a later date.

All persons are urged to study the classification. An intimate acquaintance with the classification is necessary for stenographers and filing clerks. Great benefit will result if persons who dictate letters will sufficiently acquaint themselves with the groups and subdivisions of the classification so that when dictating they will stop their letter when one of the subjects has been covered, and make the next subject the matter for another letter.

The duplication of subjects is one of the greatest difficulties experienced in the operation of the system and more familiarity with the natural groupings of the classification is, therefore, urged so this trouble may be obviated.

Persons dictating should give a title to each letter, which indicates the essence of the subject matter. This will guide the stenographer in selecting the proper file number. When you are dictating, a verbal reference should be made to any file number which may appear on a letter which is being answered. This will assist in sending the letter and the answer to the same folder.

Main Divisions.

000—General.
100—Land and Structures.
200—Rates—Statistics—Contracts—Advertising.
300—Electricity.
400—Gas.
500—Water.
600—Railways and Highways.
700—Materials and Supplies.

000—General.

010—**General—Inventories—Valuations—Reports.**
Note:—See Files 052.4, 121, 131, 210, 310, 410, and 610.)
020—**Organization.**
021—Organization Charts—Subordination of Departments—General Instructions.
025—Branch and Local Organizations.
030—**Directors—Stockholders—Officers—Employees.**
031—Directors—Stockholders.
031.1—Meetings of Directors or Stockholders.
032—Officers—Employees.
032.1—Meetings of Officers and Employees.
032.2—Applications for Positions—Introductions—Letters of Recommendation—Help Wanted.
032.21—Heads of Departments—Officials.
032.22—Superintendents and Foremen.
032.23—Engineers (Civil, Mechanical and Electrical.)
032.24—Linemen and Wiremen.
032.25—Clerks—Accountants — Stenographers—Timekeepers—Checkers.
032.26—Salesmen and Solicitors.
032.29—Miscellaneous.
032.3—Vacations—Itineraries while away from Headquarters—Trips.
032.4—Engagements & Meetings by Appointment.
032.5—Confidential or Private Matters Relating to Officers or Employees and Others.
033—Appointments—Resignations—Employment & Discharge—Rates of Pay—Hours of Work.
033.01—Employment—Appointment.
033.02—Discharge.
033.03—Rates of Pay.
033.04—Resignations.
033.05—Transfers of Employees—Advancement.
033.2 —Employment Agencies.
034—Grievances—Labor Organizations—Strikes.
040—**Public and Governmental Relations.**
040.1—Regulations of Public Utilities—Political.
040.01—Laws—Federal—State—Municipal.
040.001—Enforcement Of.
040.0011—Police and Detective Service—Protection of Property.
040.0012 — Arrests, Prosecutions, Convictions.
040.011—Federal Bills and Acts.
040.012—State Bills and Acts.
040.013—Municipal Bills and Acts.
040.014—County Bills and Acts.
040.2—Names and Other Information City, County and State Officials.
041—Relations with Federal Government.
042—Relations with State Government.
042.1—The Public Service Commission of Washington.
042.2—The Railroad Commission of Oregon.
043—Relations with County Government.
044—Relations with Municipal Government.
044.1—Municipal Competition or Ownership.
045—Relations with the Public.
045.1—Clubs—Societies—Associations.
045.11—Dues—Donations—Subscriptions.
045.2—Speeches—Published Articles—Magazines—Periodicals, Etc.

045.21—Subscriptions.
045.22—Newspaper Articles—Clippings.
045.3—Relations with Contractors, Manufacturers and Merchants.
045.4—Agriculture and Agriculture Products.
045.41—Crops, Crop Reports and Prospects.
045.42—Grain and Grain Products.
045.43—Fruits and Vegetables.
045.431—Apples.
045.432—Other Trees and Fruits.
045.433—Berries.
045.5—Forestry—Timber and Lumber Business.
045.6—Animals and Animal Products.
045.61—Live Stock.
045.62—Poultry, Game and Fish.
045.63—Dairies—Dairying.
045.7—Farm Lands, Investigations—Purchase and Sale of, Etc.
045.71—Experimental Farms—Farming Inscriptions, Etc.
046—Matters Relating to Other Companies.
046.1—General Relations with Other Companies.
046.2—Purchase or Sale of Properties.
047—Competition (Other than Municipal.)
047.1—Electric.
047.2—Water.
047.3—Gas.
047.4—Irrigation (Whether Gravity or Power.)
048—Accidents.
048.01—Charts Showing Location Of.
048.02—Employers' and Employees' Liability.
048.03—Coroners' Inquests.
048.04—Precautions Taken to Avert Accidents—Investigations.
048.1—Train and Railway Accidents.
048.2—Personal Injuries, Accidents and Sickness.
048.21—Stretchers.
048.22—Medicines and Cases.
048.23—Surgeons and Physicians.
048.231—First Aid to the Injured.
048.24—Hospitals, Relationship With.
048.25—Attempts to Defraud Company.
048.3—Claims and Damages.
048.31—Personal Claims and Suits.
048.32—Property Claims and Suits.
048.4—Payments for Damages (Personal or Property.)

050—Financial—Accounting.

051—Financial.
051.1—Stocks.
051.11—Transfer of and Registrar.
051.12—Dividends.
051.13—Common Stock.
051.14—Preferred Stock.
051.15—Voting Trust Certificates.
051.16—Escrow Agreements.
051.17—Reports of Sales.
051.19—Stock of Other Companies.
051.2—Bonds.
051.21—Bond Coupons.
051.22—Interest on Bonds.
051.23—Redemption of Bonds.
051.24—Sinking Funds.
051.25—Mortgages.
051.26—Interim Agreements.
051.27—Engineers' Certificates.
051.28—Treasury Bonds.
051.3—Banks & Banking.
051.03—Forgeries—Defalcations.
051.31—Loans.
051.32—Deposits—General Funds.
051.33—Checks—Drafts.
(Note:—For remittances, see 052.201.)
051.34—Withdrawals—Overdrafts.
051.35—Local Office Funds.
051.36—Balances & Statements.
051.4—Insurance.
051.41—Fire Insurance.
051.42—Accident Insurance.
051.43—Fidelity Bonds.
051.44—Employers' Liability Insurance.
051.45—Workmen's Compensation.
051.5—Notes.
051.51—Promissory Notes.
051.52—Warrants (City and Other.)
052—Accounting.
052.01—Auditing.
052.011—Auditor's Reports.
052.03—Improvement Requisitions.
052.04—Work Orders.
052.041—Transmittal — Approval — Cancellation.
052.042—Details — Discrepancies — Further Information.
052.05—Maintenance Orders.
(File under Specific Equipment or thing involved, if possible.)
052.06—Production Orders.
052.1—Accounts Receivable.
052.101—Statement of Cash Receipts.
052.11—Delinquent Accounts.
052.12—Railway Claims and Refunds on.
052.13—Accounts with Electric Customers.
052.131—Discounts, Rebates, Etc. Discount Periods.
052.132—Amount of Bill—Proper Charges—Disputed Bills—Final Statements.
052.133—Computation of Bills—Instructions on Billing Customers.
052.134—Collection of Accounts not Delinquent.
052.135—Manner of Handling Accounts.
(See File 052.7.)
052.14—Accounts with Gas Customers.
052.141—Discounts, Rebates, Etc. *Discount Periods.
052.142—Amount of Bill—Proper Charges—Disputed Bills—Final Statements.
052.143—Computation of Bills—Instructions on Billing Customers.
052.144—Collection of Accounts not Delinquent.
052.145—Manner of Handling Accounts.
(See File 052.7.)
052.15—Accounts with Water Customers.
052.151—Discounts, Rebates, Etc.—Discount Periods.
052.152—Amount of Bill—Proper Charges—Disputed Bills—Final Settlements.
052.153—Computation of Bills—Instructions on Billing Customers.
052.154—Collection of Accounts not Delinquent.
052.155—Manner of Handling Accounts.
(See File 052.7.)
152.16—Accounts with Railway Customers.
052.17—Merchandise and Sales Accounts.
052.171—Conditions of Sales—Agreements.
052.172—Collections—Amounts Due, Etc.
052.173—Amount of Bills—Proper Charges.
052.174—Discounts, Rebates, Etc.
052.10—Other Accounts Receivable.
052.191—Rebates on Material and Goods Received or Purchased.

052.2—Accounts Payable.
052.201—Remittances.
052.21—Labor Accounts.
052.211—Cash Advanced on Salaries of Employees.
052.212—Special Fees.
052.213—Time Slips—Time Tickets.
052.2131—Time Checks.
052.2131.1—Errors in Payment.
052.2131.2—Letters of Transmittal.
052.214—Pay Rolls—Checks.
052.2141—Errors in Payment.
052.2142—Deductions from Payroll.
052.2143—Claims for Wages Due.
052.2144—Unclaimed Wages.
052.215—Garnishments.
052.22—Material Accounts—Invoices for Material.
(Note:—File under Specific Equipment of thing involved, if possible.)
052.23—Consumers' Deposits.
052.24—Personal Expense Accounts and Reliefs—Accounts Covering Board and Lodging.
052.241—Cash Advanced on Expense Accounts.
052.25—Transportation Accounts (Freight, Express, Teaming—Livery.)
052.251—Freight and Express.
052.252—Teaming and Livery.
052.26—Rentals.
052.27—Taxes and Assessments.
052.29—Other Accounts Payable.
052.293—Hood River Gas & Electric Co.
052.294—Hanford Irrigation & Power Co.
052.295—Portland Gas & Coke Company.
052.296—Washington Irrigation & Development Co.
052.297—Columbia Valley Reclamation Co.
052.3—Earnings and Expenses.
052.31—Estimates and Statements of Earnings and Expenses.
052.311—Summary of Consumers' Ledger—Rebates and Allowances to Consumers.
052.313—Electric Properties.
052.314—Gas Properties.
052.315—Water Properties.
052.316—Railway Properties.
052.33—Increases and Reductions in Earnings and Expenses.
052.34—Departmental Expenses.
052.341—Executive and Legal.
052.342—Property and Right-of-Way.
052.343—Engineering and Construction.
052.345—Operating.
052.346—Financial and Accounting.
052.347—Merchandise Sales.
052.348—New Business.
052.4—Reports.
(Note:—All reports covering troubles or characteristics of operation should be filed under the specific equipment or thing involved if possible; otherwise under 359-459-559 or 659.)
052.41—Annual.
052.42—Monthly.
052.241—Monthly Bulletin.
052.43—Weekly.
052.44—Daily.
052.45—Construction Reports.
(All progress and other reports relating to construction work shall be filed here. All reports on any job shall be filed together, a separate folder being used for each job. The job number of "IR" shall appear on each report in addition to the file number, thus: E—052.45, I. R. 486.)
052.49—Other Reports.
052.5—Inventories and Stores.
052.6—Tank Account.
052.7—Accounting Methods.
052.71—Classification of Accounts and Matters Relating to Distribution of Charges.
(Note:—File under the specific document if possible, such as pay rolls, time slips, reliefs, invoices, requisitions, purchase orders, credit, memorandums, memorandums of transfer, etc.)
(All construction Foremen are considered as representing Construction Offices.)
061—Offices (Operating and Construction.)
061.01—Assignment of Space—Additional Space—New Quarters.
061.3—Office Methods.
061.31—Correspondence (Handling, Mailing and Other Matters Regarding Same)
061.311—Addresses and Mailing Lists.
061.312—Requests for Replies.
061.313—Filing of Correspondence.
061.314—Misdirected and Forwarded or Lost Correspondence.
061.34—Public Policies—Treatment of Customers.
061.35—Instructions to Managers and Other Representatives.
061.36—Instructions to Employees—Their Ability and Work.
061.4—Complaints.
061.43—Complaints of Electric.
061.431—Service.
061.432—Equipment.
061.433—Rates.
061.434—Appliances.
061.44—Complaints Gas
061.441—Service.
061.442—Equipment.
061.443—Rates.
061.444—Appliances.
061.45—Complaints Water.
061.451—Service.
061.452—Rates.
061.46—Complaints Railway.
(Where possible, file under specific subject.)
061.47—Complaints Material and Merchandise.
061.471—Prices.
061.472—Quality and Quantity.
(Where possible, file under specific item.)
061.6—Automobiles—Motorcycles—Bicycles.
061.8—Customers' Services.
061.81 —Electric Services.
061.811—Connections.
061.812—Disconnections.
061.813—Methods or Manner of Handling.
061.814—Reports of Work Done.
(For local office only.)
061.82—Gas Services.
061.821—Connections.
061.822—Disconnections.
061.823—Methods or Manner of Handling.
061.824—Reports of Work Done.
(For local office only.)
061.83—Water Services.
061.831—Connections.
061.832—Disconnections.
061.833—Methods or Manner of Handling.
061.834—Reports of Work Done.

[To be continued.]

COST OF ELECTRIC COOKING.

In the course of a paper regarding the value of electric heating devices to the central station recently presented before the Canadian Electrical Association. H. S. Brown gave some figures on the cost of cooking for an average family of five persons with current at 3 cents per kw.-hr. His tests were as follows:

	Breakfast. Kw.-h.	Food.	Dinner. Kw.-h.	Food.	Supper. Kw.-h.	Food.
Mon.....	.657	Oatmeal, Dropped Eggs on Toast, Toast, Coffee.	1.219	Pork Chops, Fried Apples, Boiled Potatoes, French Toast, Sauce for French Toast, Coffee.	1.338	Omelet, Fried Potatoes, Muffins, Tea, Preserves.
Tues....	.366	Corn Flakes, Fried Eggs, Toast, Coffee.	3.085	Roast Beef, Mashed Potatoes, Baked Macaroni, Caramel Pudding.	1.030	Creamed Codfish, Popovers, Preserves, Tea.
Wed.....	.581	Oatmeal, Meat on Toast, Toast, Coffee.	1.348	Soup, Steak Broiled, Steamed Potatoes, Vegetable Salad, Suet Pudding, Coffee.	.934	Beef Warmed Up, Boiled Potatoes, Bread, Tea, Cake.
Thurs...	.948	Corn Flakes, Fried Bacon, Fried Eggs, Muffins, Coffee.	1.424	Lamb Chops, Creamed Potatoes, Green Peas, Apple Pie, Coffee.	.460	Baked Beans, Toast, Sauce, Tea, Cake.
Friday..	.713	Oatmeal, Hash, Toast Coffee.	1.071	Tomato Soup, Fried Ham and Eggs, Mashed Potatoes, Turnips, Coffee Jelly, Coffee.	1.302	Creamed Beef, Fried Potatoes, Toast, Tea, Layer Cake.
Sat.....	.618	Cornflakes, Fried Smelts, Toast, Coffee.	1.393	Boiled Halibut, Egg Sauce, Steamed Potatoes, Stewed Tomatoes, Pie, Coffee.	1.192	Scrambled Ham and Eggs, Cranberry Sauce, Biscuits, Tea, Layer Cake.
Sun.....	.610	Pork Chops, French Toast, Coffee.	4.019	Roast Turkey, Cranberry Sauce, Potatoes, Onions, Suet Pudding.	.741	Cold Roast Turkey, Biscuits, Tea, Cranberry Sauce, Pork Cake.
	4.493		13.559		6.997	

Total kw.-h. for seven days..... .....25.049

Electrical standardization in China is being sought by the Engineering Society of China. A committee appointed to consider the subject has arrived at the following recommendations and decisions, which have been circulated as widely as possible in Europe and America in order to obtain free and valuable discussions and suggestions:

1. That generation and distribution generally shall be on 3-phase system at 50 or 60 cycles per second.

2. That distribution shall be carried out generally on the 4-wire 3-phase system with grounded neutral at a pressure of 250 volts between 1-phase and neutral, i. e., 440 volts (approximately) between phases.

3. That the standard pressure for domestic lighting and similar supply shall be 250 volts.

4. That when it is not desirable or economical to use a 4-wire 3-phase supply, then a 3-wire system with neutral grounded or a 2-wire system with one side grounded shall be adopted; in all cases the pressure to ground shall be 250 volts.

5. That the use of direct-current systems shall be discouraged and they shall not be allowed for systems involving either over 50 kilowatts in capacity or having feeder of over one-half mile in length.

6. That no fuses or switches shall be allowed in the neutral wire.

7. That where direct-current systems are essential the generation and distribution shall be on the 3-wire system at 500 volts between outers, the neutral being grounded.

8. That the following pressures shall be considered as standards for high-tension transmission: 2200 volts, 3300 volts, 6600 volts. Pressures above 6600 volts to be required by local and other conditions.

A Canadian water-power exhibit is planned for the Panama-Pacific International Exposition. Models of typical installations representing the low-head plants of Eastern Canada and the high-pressure plants in British Columbia are to be arranged in a semi-circle, behind which will be a representative landscape painting. The painting, which is to be 9 ft. high and 75 ft. long, will be executed by a noted landscape artist of Toronto.

The Adamson bill regarding the construction of dams across navigable streams was passed by the House of Representatives on August 4th. It provides that plans and specifications for such dams must be approved by the Secretary of War and the Chief of Engineers before work of construction is commenced. Approval may include the condition that water-power to operate locks, etc, be supplied without cost, or a reasonable annual charge may be made for the benefits that accrue to the grantee by the authority given under the act. The dam shall be so located as to be best adapted to a comprehensive plan for the improvement of the waterway for the use of navigation and for the full development of the water-power.

The rights granted under the act extend over a period of fifty years beginning on the date of the original approval. Upon two years' notice prior to the expiration of the grant the United States has the right to take over the property of the grantee necessary and useful for the generation, transmission and distribution of energy, the payment therefor being based on the actual cost of the lands purchased and used by the grantee and the fair value of the other properties taken over. Allowance will be made for deterioration but not for good will or profit in pending contracts.

The Secretary of War is empowered to prescribe reasonable rates of charges for energy transmitted in "interstate or foreign commerce." When the energy is used within a state having adequate regulation for rates and service to the consumer the Secretary of War will not interfere with the established rules for rates and service.

The elimination of metallic resistance has been practically accomplished by Prof. Omnes of Leyden by reducing the temperature of the conductor to within a few degrees of absolute zero by placing it in liquid helium.

Electrical stimulation of plant growth is being extensively tried by W. J. Anson on a small tract of land near Wilmar Station on the Covina line of the Pacific Electric Railway of Los Angeles. Tile conduits have been laid in the soil to a depth of from 14 to 16 in. and carry iron wires tapped from a feed line across the end of the plot. According to the inventor, the treatment not only aerates and retains moisture in the soil, but also removes danger of frost damage, as a resistance coil may be placed at each tree.

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NOTICE TO ADVERTISERS.

Change of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to noon of Monday dated Saturday of the same week. Where proof is to be returned for approval, Eastern advertisers should mail copy at least thirty days in advance of date of issue.

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The Injury of the Ideal Specification

The ideal advertisement is said to have never been written. In the sense that a specification is an advertisement of the thing required, many are still very far from a "realizable ideal"—something inconceivable to the average mind. It is important in engineering works that the materials supplied be "up to specification." This involves that the specifications be possible of fulfillment and that the purchaser satisfy himself that the materials supplied are in accordance with the specifications.

Honesty is the prime essential in each instance. But, like man who evolves it, a specification is usually fearfully and wonderfully made.

The art of writing specifications seems always to be somewhat in advance of practicability. Consequently fewer bids are submitted, as many fear that they cannot conscientiously live up to the specifications. They therefore, eliminate themselves as competitors, because they have no means of determining that no one could actually live up to the specifications as written. They think that their facilities have not enabled them to keep up with the rapid advance of their craft, and so they leave it to those better informed as to this situation to secure the business, though with no better product or possibilities than their own, and only too often at an unnecessarily high price.

Advantage is also taken of the fact that but few purchasers have the facilities for so testing the materials supplied that they can be certain that their purchases are up to the mark set, even when that mark comes within the bounds of the practical. This fact also is not known to the fearsome bidder and would probably not be taken advantage of, even if it were.

To the extent that a specification is outside practical bounds it destroys its own purpose, especially in destroying the widest competition. Herein lies the injury of a false ideal.

An overdrawn specification may also defeat its purpose through too strongly tempting the honesty of bidders, some of whom may succumb to the temptation in these strenuous days of co-operative competition, especially when it is known that the purchasing corporation with its ideal specification, has no means of determining whether it is lived up to.

It is time that the various bodies interested—research societies, engineering associations, manufacturers, agents, contractors and purchasers, get together in the writing of specifications worthy the service for which they are required. We live in a practical age. Because this is so, the specification should consist of a definite, particularized and complete statement of the thing actually required and possible of delivery. There is a gaping gulf between the ideal and the real which may never be spanned. The next requirement is the establishment by all large corporations of adequately equipped testing laboratories which will enable them to determine whether their practical specifications are lived up to, and which will serve as a silent monitor to those bidders who are inclined to be not quite as honest as might be desired.

So, may yet another hole be unplugged in the hull of the pirate craft of unfair competition.

Governmental activity in the extension of markets has created keen interest among manufacturers.

Promoting Our Peaceful War

Commerce of today abhors national conflict, though innumerable wars of the past had their origin in the need for the extension of markets on the part of the nations involved.

Actual warfare is now recognized to be confusion worse confounded; loss, uneconomical even where the territory or concession desired is ultimately obtained. The devastating influence of war is world-wide and its avoidance in any quarter a matter of interest to all. The interdependence of the trade of nations offers a further argument against the precipitation of international quarrels.

Being in the quarrel, none would, however, wish to limit, through lack of finances, the operations of army or navy. Under these circumstances, the enormous, eagerly voted appropriations made by the great powers of Europe, are commendable, though the possible gain is insignificant compared with what might have been expected from a direct use of the money for manufacturing purposes, or by the various nations in the extension of markets for the overproduction of the factories within their borders.

Governments are generally penurious in voting appropriations for the purpose of making possible the commercial victories of peace. Thousands are then expected to do the work of the millions voted for warfare.

Our own government is no exception to this rule, and in the light of recent developments the hundred thousand dollars lately voted for the extension of markets certainly appears small. What might not be accomplished by the willing expenditure for peace purposes of the enforced amounts spent in times of war? And to do this would be to make war economically impossible.

The United States is often referred to as making a gradual though peaceful conquest of the world by successfully selling its manufactures in the markets of all nations, but the complete realization of this plan will be indefinitely postponed unless a commensurate governmental monetary backing is assured. Otherwise the necessary men of wide outlook, of business acuity and imagination wide as genius can devise, cannot be secured to occupy the important proposed positions as commercial attaches of the government.

The plan is perfect, for the scientific management of a business consists in action based upon definite knowledge, and that of a nation is predicated upon the same principle.

The amount available for the remuneration and expenses of these commercial attaches, and for the allied plans having for their common object the extension of markets is undoubtedly much smaller than the annual expenditures of many private corporations for the same purpose.

The United States would not be behind European countries in the magnificence of her monetary backing of her arms in time of actual warfare and this precludes any possible excuse for such niggardliness in promoting her peaceful war with its ultimate object of the commercial conquest of the world.

In these latter days of conversation about conservation some attention is being given to the conservation of that most precious of

Welfare Work

energies, the human workman. Managers are studying the best way to develop human forces, the most efficient methods in applying them, and the wisest means to conserve them. Business, as a complicated action and reaction of forces, is largely a matter of human engineering. Even cold business is being warmed into thoughts of kindness by the stern knowledge that whatever dissipates the energy of the worker is a handicap to effective production.

Much of this conservation of human energy is being accomplished by welfare work, a direct interest of the employer in the comfort and well-being of his employees. While this interest was originally inspired from a sentimental standpoint, the results have shown that, like honesty, it is also the best business policy. Today it may be truely termed the capitalization of philanthropy.

Man-power costs more than any other form of energy in commercial use. All the boasted increased efficiency and conservation of water, steam, gas and electric power is of little avail without a corresponding increase in man-power. This is now being done by welfare work, whose prime purpose is to conserve human forces and to promote industrial progress.

A tired man cannot do efficient work.

The three physical fatigue factors which can be most easily remedied are light, air and temperature. Good light, properly distributed, enables man to do good work for long periods; what is needed to conserve vision and prevent eye fatigue is not more light, but better light, light with less glare. Good ventilation and a proper working temperature also prevent needless exhaustion. These factors, together with sanitation, however, are getting beyond the experimental stage of philanthropy and are now being required by law.

Much is also being done to improve the psychological environment of workers by providing for their comfort, instruction and recreation. Medical service, reading rooms, gymnasiums, pension systems, life insurance, lectures, and the like represent an effort to increase the physical, mental and moral welfare of the employees in the knowledge that contented men do more and better work.

The increased efficiency of the individual is the goal of all such welfare work. Any means which a company can adopt to emphasize the individual element adds to the co-operative spirit which binds the organization together. The Southern California Edison Company of Los Angeles, for example, has adopted an insignia, known as "the Edison emblem," as a reward for long, honest and honorable service. Many other methods are being tried to cultivate a sense of individual responsibility and individual pride in performance. More intimate contact or at least more direct contact, between employer and employee, creates a sympathetic understanding and is the means of establishing harmony between capital and labor.

PERSONALS

M. L. Scobey, salesman with the San Francisco office of the Pacific States Electric Company, is at Portland.

B. Cooper, purchasing agent of the Southern Sierras Power Company, spent the past week in San Francisco.

H. B. Squires, electrical manufacturers' representative, has returned to San Francisco from an extensive Eastern trip.

W. Baird of the Baird Electric Company, Modesto, California, spent several days during the week in San Francisco.

J. G. McDonald, president of the West Side Gas Company, Taft, California, was a visitor to San Francisco during the week.

C. S. MacCalla, general manager of the Washington Water Power Company, has returned to Spokane from Gearhart, Ore.

R. F. Hayward, general manager Western Canada Power Company, has returned to Vancouver, B. C., from an extended trip through eastern cities.

W. P. Todd, salesman for the Western Electric Company, San Francisco, is making a business trip through the Coast country region of California.

Harry Bayford, of Vancouver, B. C., has joined H. M. C. S. Rainbow, as electrician. The Rainbow is aiding in the protection of the Pacific Coast.

H. W. Cope, director of exhibits, Westinghouse Electric and Manufacturing Company, San Francisco, returned during the week after a trip to Pittsburg.

E. F. Suys, president of the Northern Electric Company, Ltd., and **M. B. Pike,** manager of branches, were at Vancouver and Victoria, B. C., during the past week.

E. H. Verner, engineer of Port Coquitlam, B. C., has been appointed by the Maillardville council to make an estimate of the cost of installing a water system.

W. L'Homedieu, manager of the railway and lighting department, Westinghouse Electric and Manufacturing Company, San Francisco, left for a trip through Southern California.

W. R. Jones, inspector of Canadian Pacific Railways Telegraphs, has been appointed inspector of telegraphs, with headquarters at Lethbridge, Alta., on a newly created division there.

C. W. Van Dyke, president and general manager of the Miami Light and Power Company and Miami Telephone Company, Miami, Arizona, spent the week in San Francisco on a business trip.

R. L. Phelps of Pierson, Roeding & Co.'s San Francisco organization took one of the principal parts in the annual jinks of the Bohemian Club at Bohemian Grove, which were attended by many electrical men.

Francis E. Wilkinson has returned to San Francisco from a two months trip to Europe, where he was reporting to financial interests regarding California developments. He is making local headquarters in the Mills Building.

T. S. Dick, traveling auditor of the Westinghouse Lamp Company, with headquarters in New York City, is in Salt Lake City checking up the Inter-mountain district of this company with headquarters there. His work will require from one month to six weeks.

Hal Lauritzen, Pacific Coast manager of Holophane Works of the General Electric Company, San Francisco, and **J. T. Stewart** of the same company, have returned from an extended trip through the East, during which they visited the home office and works of their concern.

Robert L. Eltringham, safety engineer with the Industrial Accident Commission of California, located at San Francisco, is on an investigating trip through Los Angeles and Southern California, during which he expects visiting all the power, central station and electric railway plants.

James Fell, officer commanding the Sixth Field Company of Canadian Engineers, is advertising in Western Canadian papers for recruits. This company is located at North Vancouver, B. C., and in his advertisement Major Fell mentions electrical engineers and telegraphists as particularly desired.

J. E. Boesch, distribution engineer B. C. Electric Company, Vancouver, B. C., who holds a commission in the Engineering Corps of the Swiss army, has been recalled to his native country on account of the unrest in Europe. Switzerland is mobilizing an army of 175,000 in order to ensure the maintenance of her independence. Mr. Boesch is a member of the A. I. E. E.

A. L. Woodhouse, general manager of the Beaver River Power Company, with headquarters at Richfield, Utah, is in Salt Lake City to attend a meeting of the board of directors of the Capital Electric Company and to confer with L. L. Nunn, president of the Beaver River Power Company. Mr. Nunn is also in Salt Lake City in connection with the suit now pending against the Beaver River Company, alleging trespass on federal lands. The grounds of the suit are similar to those heretofore filed against the Utah Power & Light Company and the Utah Light & Railway Company.

C. A. Hansen, specialist for the General Electric Company on the electric furnace and the electrical separation of zinc and copper, is in Salt Lake City for the purpose of going over the works of the Utah Copper Company at Bingham for the purpose of determining the feasibility of applying electrical ore separation to their work. Managing Director **D. C. Jackling** of the Utah Copper Company, who is also president of the Utah Power & Light Company, which has a contract with the copper company for supplying the electrical requirements of all of their smelting and mining work, is very much interested in the problem and is lending every assistance toward its solution.

O. L. Waller, of the state college at Pullman, Wash., is conferring with the farmers in regard to preventing separator fires and explosions, the growing number of which is causing considerable alarm in this part of the state. One farmer has advanced the theory that the explosions are due to the electricity generated in the separator. He has connected copper wires to the journals of his machine and has attached these to bolts driven into the ground which he waters thoroughly. His machine has been operated without trouble under this precaution. Professor Waller recommends running exhaust steam into the separator near the cylinder in order to slightly dampen the atmosphere. It is feared that this last method may damage the grain.

R. H. Sperling, retiring general manager of the British Columbia Electric Railway Company, Vancouver, B. C., was recently given a farewell social and presentation. Dancing and a musical program provided the entertainment for those present. The presentation was made during the evening and consisted of a solid gold cigar box suitably engraved and bearing the Sperling family coat-of-arms. Mrs. Sperling was the recipient of a magnificent diamond ring. The presentation was made by **F. S. Barnard,** a resident director of the company, who referred to Mr. Sperling's success in the position which he was relinquishing in order to take up more important work on the board in London. Mr. Sperling in reply thanked the staff for their loyal co-operation which had made possible his measure of success and hoped that the social evenings started under his administration would be continued. He asked for a continued support for the new general manager. **A. G. Perry,** local manager at North Vancouver, presented a framed picture of the members of the North shore staff. On Monday evening a farewell banquet was given Mr. Sperling at the Hotel Vancouver by the officials of the company, which was presided over by **George Kidd,** now general manager of the company. Representa-

tive officials from all over the company's extensive system were present. The toasts of the evening were to The King; Our Province, proposed by **W. G. Murrin,** mechanical superintendent, and replied to by **A. T. Goward,** manager of the Victoria branch; Our Company, proposed by **C. Rummel,** manager light and power department, and responded to by **C. R. G. Conway,** chief engineer; Our Guest, proposed by General Manager **George Kidd,** and seconded by **F. R. Glover,** general executive assistant. Musical and other entertainment was provided. The table was arranged in the form of a horseshoe, about 75 ft. long, one of the features of the decorations being a miniature third rail system which operated continuously though not quite as smoothly as the company's system. The ends of the horseshoe were spanned by a suspension bridge.

MEETING NOTICES.

Safety First at Salt Lake City.

On August 12th the Utah Light & Railway Company called a special meeting of all of their employees at which Mr. E. M. Bagley, the company's claims attorney, and Mr. L. E. Abbott, commissioner of safety for the Oregon Short Line R. R. Company and members of the Utah Light & Railway Company's Safety Committee gave illustrated talks and demonstrations on the "Safety First" movement. Two sessions were necessary in order to accommodate all of the company's employees. The meetings partook somewhat of the nature of a smoker, cigars and light refreshments being served.

BRITISH COLUMBIA ASSOCIATION OF ELECTRICAL INSPECTORS—SECTION N. A. E. I.

A meeting of the above section was held in the city hall, Vancouver B. C., on July 31st., the following being present: C. H. Fletcher, city electrician, Vancouver, and J. W. Cook, W. C. Jenkinson and T. F. Walker, of his department. R. J. Roache, electrical inspector, Point Grey; C. Stearn, city electrician S. Vancouver; and O. Mansfield, Light & Power department, B. C. Electric Railway Company.

After routine business and other matters had been transacted the following questions submitted by the parent association were discussed, the answers as given being unanimously agreed upon:

Ques.—Would you consider that Rule 30 (a) had been complied with if the insulating joint is omitted where a chain fixture 6 ft. long is suspended from the conduit outlet, and the outlet is controlled by a switch (the fixture being too high to be reached from the floor) cord being used No. 16 with 3/64 insulation and common brass shell socket?

Ans.—No. It would require an approved socket as provided for in 30 (a).

Ques.—Does "in which the insulation of conductors is the equivalent of insulation in other parts of the system," allow the use of wire as No. 10 or No. 16 provided the insulation is the same as for conduit work, namely, 3/64 in.

Ans.—Yes. Provided it is used for the wiring of fixtures only.

Ques.—Are common brass shell sockets considered the "equivalent insulation" of porcelain as applied to this rule?

Ans.—No.

Ques.—Regarding Rule 32 (e). Is the prohibition against flexible cord in show windows intended to apply to the permanent lighting only or also to temporary displays of portable lamps, flat irons, and other electrical devices? If one carries in mind the distinction between pendant cord and portable cord, will the answer be different?

Ans.—The ruling on both questions is, that Rule 32 (e) prohibits the use of portable cords.

Ques.—Is it permissible to run a ground wire in the same conduit with other wires of the same system?

Ans.—Yes.

Ques.—In a steam bakery oven it is desired to run a conduit about 6 ft. long inside the brickwork where the temperature will reach 400 deg. F. What kind of insulation should be used in this case?

Ans.—Slow-burning wire should be used.

Ques.—What is considered proper ventilation under Rule 33-a-7? If a flue is required should it not be installed in a manner similar to smoke flues of furnaces; that is to say, with air spaces or other heat insulation between the flue and the near woodwork?

Ans.—An air space would be required.

Ques.—Rule 86 (a) requires aerials grounded on street side of water service cock. In case of very high buildings this imposes considerable hardship which might perhaps be removed in the case of steel skeleton buildings by grounding on this itself, of course being careful that all pipes are bonded on steelwork on floor where ground wire is attached and also in basement. Would such an arrangement be considered proper?

Ans.—Would consider that the steel frame of the building would be equal to the water pipe.

NEWS OF CALIFORNIA RAILROAD COMMISSION.

The Lindsay Home Telephone & Telegraph Company, operating in the City of Lindsay, Tulare County, has filed an application with the commission asking authority to borrow $2000 and to issue its notes therefor. The company expects to use the larger portion of this sum in connecting new subscribers and making additions to its plant.

The commission has rendered a decision authorizing the Modesto Interurban Railway, operating between Modesto and Empire, to issue 144 shares of its capital stock at the par value of $100 per share. This stock is to be issued to various persons in return for property, cash advanced and other obligations.

The Hanford Gas & Power Company of Hanford, Kings county, has filed an application with the commission asking authority to issue its note for $6000 for 90 days at 6 per cent interest, to be used in renewing a loan with the Wells, Fargo, Nevada National Bank.

The San Joaquin Light & Power Corporation has filed a complaint with the commission against the Tulare County Power Company. The complaint alleges that the Tulare County Power Company is indebted to the San Joaquin Light & Power Corporation in the sum of $15,619 for electric energy furnished under contract. The commission is asked to order the payment of this sum, or in lieu thereof, to order the Tulare Company to discontinue further extensions to its system and apply its earnings to the liquidation of its indebtedness, or to allow the San Joaquin Company to discontinue service until the sums owing it are paid in full.

The commission has rendered a decision authorizing the San Joaquin Light & Power Corporation to issue a promissory note in the sum of $10,000 for the purpose of refunding a note in like amount.

The commission has made a supplemental order authorizing the San Diego Consolidated Gas & Electric Company to apply the proceeds from the sale of $23,000 bonds against construction expenditures incurred between May 31 and November 1, 1914.

The commission has made a supplemental order authorizing the Southern California Gas Company to use the sum of $165,033.19 derived from the sale of certain preferred stock for the purpose of reimbursing its treasury for capital expenditures made in connection with improvements to its plant and system.

The commission has rendered a decision authorizing the Montecito Railroad Company to issue 50,000 shares of capital stock of the par value of $1.00 each. The proceeds from the sale of this stock are to be used by the company to build a street railroad 2.4 miles in length in the city of Los Angeles.

ELECTRICAL CONTRACTORS' DEPARTMENT

CONTRACTORS' CONVENTION AT SACRAMENTO.

The fifth annual convention of the California Association of Electrical Contractors and Dealers held at Sacramento from August 4-8, inclusive, was the most successful in the history of the organization. This success was not only in point of attendance, 193 registered, but also with regard to results accomplished.

The first three days of the convention were devoted to consideration of matters of interest primarily to the contractors, while the balance of the time was occupied with subjects of public concern. The new constitution and by-laws was the subject of much interesting discussion, as was also the matter of standard specifications to be supplied to architects.

Standard specifications for wiring of buildings for telephone service were adopted in co-operation with the Pacific Telephone & Telegraph Company. It includes all details for wiring telephones in buildings except the main terminal cabinet. The telephone company's inspection department will approve all plans before and after construction work is started.

In the closing session of the members C. V. Schneider of Sacramento was re-elected president and the association affairs placed in the hands of a board of management, whose members are C. V. Schneider, president; W. S. Hanbridge, San Francisco, secretary; F. J. Somers, San Jose; J. Boynton, San Francisco; Geo. Gilpen, Oakland; and Claude Loveday, Santa Barbara. San Francisco was selected as the 1915 meeting place, the meeting to be distinct from that of the national association.

The papers presented at the public meeting on Friday were all concerned with methods by which the contractors could co-operate with each of the other branches of the electrical industry. W. W. Briggs spoke as the representative of the central stations; C. E. Heise from the standpoint of the manufacturer; T. R. Hunter showed the relation with the engineer; H. V. Carter represented the jobbers' viewpoint; C. F. Butte dwelt on the contractors' side and A. E. Elliott summed up the entire situation in an address on co-operation. The several papers will be published in this and succeeding issues.

Entertainment.

The entertainment of the members and guests was most lavish and too much credit cannot be given to those having the various features in charge. It started with a reception and dance on Wednesday evening, during the course of which Mr. Geo. C. Holberton gave an illustrated lecture on the system of the Pacific Gas & Electric Company. On Thursday afternoon a long automobile ride was taken through Sacramento valley and in the evening a moonlight boat ride and dance was held.

The annual dinner on Friday evening was a gastronomical and musical feast. Among the guests Mrs. Fannie Forrester Wellman and Miss Elliott favored those present with several musical selections by special request. Mr. Tom Scott acted as toastmaster, calling in turn on A. H. Elliott, C. V. Schneider, Claude Loveday, who presented a handsome cut glass bowl to Mrs. Schneider as an expression of appreciation from the ladies, Mrs. Schneider gracefully responded, W. H. P. Hill, F. J. Symmes, J. C. Renler, W. L. Goodwin, W. S. Berry, C. J. Mitchell and W. S. Hanbridge.

On Saturday an outing and picnic was enjoyed at Smith's Mound on the Sacramento River nearly two hundred contractors and guests taking the ride up the river. Each person was served with an excellent individual lunch, after which those who so desired could enter the fishing contest, while the others danced or competed in the long list of sports. Prizes were awarded to the winners of the various contests. Dancing was also indulged in during the return trip, the crowd reaching Sacramento tired but happy, in time for dinner. An automobile trip was arranged for the ladies while the rejuvenation was in progress on Saturday night. A hearty vote of thanks was extended to the electrical people of Sacramento for their hospitality.

Group of Electrical Contractors at Sacramento.

The following list shows who registered at the convention:

Alexander, Earl G., Alexander & Lavenson, San Francisco.
Alvord, R. M., General Electric Co., San Francisco.
Ames, Chick, National Electric Co., San Francisco.
Baker, Sylvester A., Macbeth, Evans Glass Co., S. F.
Baruch, S. N., Baruch Elec. Con. Corp., Oakland.
Battee, Geo. H., Elec. Agencies Co., San Francisco.
Berry, W. S., Western Electric Company, San Francisco.
Boynton, Mr. and Mrs. J. R., Central Electric Co., S. F.
Briggs, W. W., Great Western Power Co., San Francisco.
Britling, Ed., Scott, Lyman & Stack, Sacramento.
Brockway, Mr. and Mrs., Latourette-Fical Co., Sacramento.
Burkhart, E. F., Palo Alto.
Butler, Miss, Pacific States Elect. Co., San Francisco.
Butte, Mr. and Mrs. C F., Butte Elect & Mfg Co, S. F.
Camp, W. E., General Electric Co., Sacramento.
Carlson, Jos. M., Central Electric Co., San Francisco.
Carter, H. V., Pacific States Electric Co., San Francisco.
Commerford, A. E., J. C. Hobrecht Co., Sacramento.
Conrad, Mr. and Mrs. R. H., Conrad Elec. Co., Oakland.
Crombach, Mr. and Mrs. John A., Sacramento.

Daley, H. H., Westinghouse Lamp Co., San Francisco.
Douglas, Mr. and Mrs. R. L., Great Western Pr. Co., Sac.
Dieferbrosch, M. H. and family, Sacramento.
Dillon, Mr. and Mrs. Thos. J., Great Western Pr. Co., Sac.
Dolan, Mr. and Mrs. W. C., Electrical Supply Co., Sacramento.
Drew, Mr. and Mrs. Geo. H., Pacific States Elec. Co., Oakland.
Dunbar, W. R., Westinghouse Elect. & Mfg. Co., S. F.

Eckland, Mr. and Mrs. H. R., San Rafael.
Ellison, Mr. and Mrs. Frank, City of Oakland, Oakland.
Elliott, Mr. and Mrs. Albert H. and daughter, Attorney, S. F

Fagan, F. D., General Electric Co., San Francisco.
Fagg, J. H., Pacific Gas & Elect. Co., Sacramento.
Flanagan, A. F., Elec. Eng. & Supply Co., Stockton.
Fulton, A., General Electric Co., San Francisco.

Gensler, Mr. and Mrs. J., Oakland.
Gibson, B. Y., Elect. Ry. & Mfg. Co., San Francisco.
Gill, C. R., P. G. & E. Co., San Francisco.
Gilpen, Mr. and Mrs. S. B., Piedmont Elec. Co., Oakland.
Goodwin, W. L., Pacific States Elec. Co., San Francisco.
Graham, Chas., Graham & Lamus Co., Sacramento.
Gregory, Mr. and Mrs. S .B., Arrow Elec. Co., San Francisco.
Gribbie, Wm. H., Kimball Elec. Co., Oakland.
Griswold, A. E., A. G. Electric Co., Seattle.

Halloran, A. H., Journal of Electricity, San Francisco.
Hanbridge, Mr. and Mrs. W. S. and daughter, S. F.
Hansen, B. A., A. G. Electric Co., San Francisco.
Harris, D. E. Pacific States Electric Co., San Francisco.
Hartzell, H. C., Maydwell Co., San Francisco.
Heise, C. E., Westinghouse Elec. & Mfg. Co., San Francisco.
Herbert, C. H., Westinghouse Elec. & Mfg. Co., S. F.
Hill, B. C., City of Oakland, Oakland.
Hill, Mr. and Mrs. W. N. P., Great Western Power Co., Sac.
Hillis, C. C., Electric Appliance Co., San Francisco.
Hobrecht, Mr. and Mrs. J. C., Sacramento.
Holberton, Geo. C., P. G. & E. Co., San Francisco.
Hooker, J. W., Thomas Day Co., San Francisco.
Hope, Mr. and Mrs. N. M., The Turner Co., San Francisco.
Hyde, P. B., Thos. A. Edison, Inc., San Francisco.

Jacobs, J. C., Jacobs Electric Co., So. Pasadena.
Jarvis, Mr. and Mrs. T. P., San Francisco.
Johnson, C. E., Am. Ever Ready Co., San Francisco.
Johnson, C. M. San Francisco.

Keyes, H. C., Dunham, Carrigan & Hayden Co., Sacramento.

Lamus, Mr. and Mrs. C. A., Graham & Lamus Co., Sac.
Lewis, W. B., Western Electric Co., San Francisco.
Levy, Mr. and Mrs. Louis, Levy Elec. Co., San Francisco.
Libby, Mr. and Mrs. F. C., Scott, Lyman & Stack, Sacramento.
Loveday, Mr. and Mrs. C., Santa Barbara.

McDonnell, Wm., Electrical Supply Co., Sacramento.
McNally, Mr. and Mrs. W. A., Pasadena.
Mitchell, C. W., Board of Fire Underwriters, San Francisco.
Murray, E. K., Western Elec. Co., San Francisco.
Musladin, Chas. R., Alexander & Lavenson, San Francisco.
Myers, Mr. and Mrs. Romaine W., Oakland, Cal.

Neelands, W. L., Western Elec. Co., San Francisco.

Pearce, Mr. and Mrs. G. Stanley, City of Sacramento.
Peck, A. P., Electrical Supply Co., Sacramento.
Pinger, Mr. and Mrs. F. C., Richmond, Cal.
Poss, F. H. Benjamin Elec. Co., San Francisco.
Potter, F. B., 424 E 16th street, Los Angeles.
Powell, Mr. and Mrs. Noble, Stockton.

Rendler, Mr. and Mrs. J. C., So. California Elec. Co., L. A.
Richmond, J., Decker Elec. Co., San Francisco.
Robscheit, H. T., Westinghouse Lamp Co., San Francisco.
Rowe, A. E., Tel. El. Equipment Co., San Francisco.

Sanderson, H. E., Bryant Elec. Co., San Francisco.
Sayles, H. A., Holabird, Reynolds Co., San Francisco.
Sawyer, C., 321 Mission street, San Francisco.
Scott, Mr. and Mrs. Tom and daughter, Sacramento.
Schloss, L. A., General Electric Co., Sacramento.
Schultz, Mr. and Mrs. H. F., Electric Appliance Co., S. F.
Schmeiser, Misses, Sacramento.
Scoville, W. D., Latourette-Fical Co., Sacramento.
Scobey, M. L., Pacific States Electric Co., San Francisco.
Shreve, E. O., General Electric Co., San Francisco.
Sittman, Mr. and Mrs. Geo. A., Gen. Elec. Const. Co., S. F.
Smith, Geo. D., Elec. M. & M. Co., San Francisco.
Smith, Paul, Oakland.
Smith, R. E., National X-Ray Reflector Co., San Francisco.
Smith, Walter, J. C. Hobrecht Co., Sacramento.
Somers, Frank J., Century Elect. Co., San Jose.
Steel, Miles F. Benj. Elec. Mfg. Co., San Francisco.
Strand Mr. and Mrs. W. A. Electric Stores Company, Sac.
Stack, Mr. and Mrs., G. B., Sacramento.
Symmes, F. J., Thomas Day Co., San Francisco.

Thieben, Jos., Panama Elec. Lamp Co., San Francisco.
Thomas, W. D., Elec. Ry. & Mfg. Supply Co., San Francisco.
Thompson, J. M., Johns-Manville Co., San Francisco.
Tobey, J. O., P. G. & E. Co., Sacramento.

Valentine, Mr. and Mrs. Geo., Graham & Lamus Co., Sac.
Vandegrift, J., National Lamp Works, Oakland.

Watts, Mr. and Mrs. Frank W., McFell Electric Co., S. F.
Waxon, Peter, Waxon Bros., Sacramento.
Waxon, Frank, Waxon Bros., Sacramento.
Weber, E. C., Ickelheimer Bros. Co., San Francisco.
Wellman, Mr. and Mrs. Geo. H., Electrical Review, Chicago.
Welch, A. S., Electric Agencies Co., San Francisco.
Werner, W. R., Pacific States Elec. Co., San Francisco.
Wilkinson, Mrs. A., Association, San Francisco.
Wilson, Fred W., Standard Underground Cable Co., S. F.
Woods, J. A., California Mech. E. E. Co., Sacramento.
White, H. J., Keeler, White & Co., San Francisco.
Wylie, J. W., West Sacramento Electric Co., Sacramento.

Yost, H. F., Elec. Stoves Co., Sacramento.
Youngbholm, A., Westinghouse Lamp Co., San Francisco.
Youdell, L. F., E. & M. Equip. Co., Stockton.

Jovian Rejuvenation.

The convention was brought to a close by a rejuvenation of the Jovian Order on Saturday in the beautiful Elks hall, where was staged what is believed to be the most effective presentation of the ritual which has been exemplified in the West. Statesman C. S. Pearce and his co-workers deserve great credit for the manner in which the rejuvenation was conducted and the representative candidates initiated.

The degree team consisting of

Jupiter, R. L. Douglas	Hercules, J. O. Tobey
Neptune, T. L. Nightingale	Mars, L. A. Schloss
Vulcan, C. A. Lamus	Apollo, R. C. Eyerly
Pluto, John H. Fagg	Avrenim, J. C. Hobrecht
Mercury, C. R. Gill	

Imps: W. C. Dolan, H. F. Yost, H. A. Sayles, A. L. Commerford.

had memorized all their work and delivered it very effectively. Geo. H. Middlemiss contributed much harmony to the meeting by presiding at the piano.

The class of twenty included many of the most prominent electrical men of Sacramento who had not previously joined. They were as follows.

W. N. P. Hill, Manager Sacramento District, Great Western Power Company, Sacramento.

C. P. Taylor, Foreman, Substation Pacific Gas & Electric Company, Sixth and H streets, Sacramento.

C. W. Beaton, Chief Electrical Inspector, City Hall, Sacramento.

W. D. Thomas, Salesman, Electric Railway & Manufacturers' Supply Company, San Francisco.

H. T. Schultz, Salesman, Electric Appliance Company, San Francisco.

T. J. Dillon, District Superintendent, Great Western Power Company, 1024 K street, Sacramento.

J. W. Wylie, Manager West Sacramento Electric Company, Box 339, Broderick P. O.

S. W. Baruch, Vice-President, Electric Controller Corporation, 424 Thirteenth street, Oakland, Cal.

James W. Coons, Superintendent, Solano Power Division, Pacific Gas & Electric Company, Davis, Cal.

W. B. Smith, Salesman, J. C. Hobrecht Company, 1014 Sixth street, Sacramento.

R. H. Conrad, Manager, Conrad Electric Company, 564 Eighteenth street, Oakland.

C. H. Herbert, Salesman, Westinghouse Electric & Manufacturing Company, San Francisco.

Geo. B. Sanford, Manager, Rio Vista District, Great Western Power Company, Rio Vista, Cal.

W. D. Scovill, President Latourette-Fical Company, Thirty-fifth and Sacramento avenue, Sacramento.

Jas. A. Woods, President and Manager, California Mechanical & Electrical Engineering Company, 2906 R street, Sacramento.

T. P. Jarvis, Owner, Jarvis, Stearn & Electric Company, 275 Connecticut street, Sacramento.

Jos. W. Hooker, Salesman Thomas Day Company, 725 Mission street, San Francisco.

Jos. Thieben, President and Manager, Panama Electric Lamp Company, 595 Mission street, San Francisco.

E. A. Weymouth, Assistant Manager, Pacific Gas & Electric Company, Sacramento.

Sylvester A. Baker, Manager, Pacific Coast office Macbeth-Evans Glass Company, Rialto Building, San Francisco.

After the rejuvenation a Dutch lunch was served and several talks was given, Tom Scott acting as toastmaster. A. H. Halloran, National Vulcan, spoke of the purposes of the order, A. H. Elliott spoke on the benefits of co-operation, as did likewise A. E. Rowe, Statesman at San Francisco; C. S. Pearce, Statesman at Sacramento; R. M. Alvord and G. N. P. Hill.

HOW CAN THE CONTRACTOR AND DEALER CO-OPERATE WITH THE CENTRAL STATIONS.

BY W. W. BRIGGS.

The exponent of co-operation has been abroad in the land for some time and we have heard papers by the yard and speakers by the hundreds. Closely following are the exponents of scientific management and other uplifting projects. Without question this agitation must have accomplished some good—at least it has produced in our minds a desire to go further and look more closely for suggestions as to ways and means for the improvement of our condition and to seek for individual and practical applications of basic theory to our daily life.

I propose herein to give you a simple thought and theme to work on, and perhaps when this over with you will all wonder why so many words to convey such a simple idea. The only answer perhaps would be that we must make this kind of thing look difficult to accomplish and as representing deep study.

Without doubt the welfare of the central station, its development and sustained activity have much to do with the welfare of the contractor and dealer. Lack of progress and development and the shutting off of line extension due to lack of funds all tend to slow down the business of the contractor and dealer. Hence, they have a vital interest in the success and welfare of the central station.

Within the last year the public utilities have felt keenly the conditions of the world's money markets. Particularly have we in California been embarrassed, with large work on hand and the tremendous demands made by rapidly growing and widely scattered communities, making necessary the providing of vast sums for development purposes, which were indeed hard to get. Contributing to the general financial inactivity was the feeling of uncertainty as to the soundness of public utilities securities, owing to rapidly changing political conditions, the (to our people) somewhat untried question of regulation, etc.; but most of all, to my mind, the inactivity was occasioned by an almost universal feeling of unrest and dissatisfaction among the people as a whole. These conditions may be hard to explain. Certainly, I for one do not intend to indulge in obtuse theories on political economy, in the endeavor to do so, but will confine myself to the simple statement that, from personal observation, I believe that if the people as a whole have little faith in the management of the public utilities serving them it is because of lack of knowledge or study of the contributing conditions, and in consequence their minds are molded by irresponsible critics and editorial statements contained in the daily press, which in effect reflect the opinion of some who have not given the subject much thought.

We still hear reiterated the famous statement of what Commodore Vanderbilt said about the public, even though that gentleman has been dead at least 37 years, and his policies for about the same time. Just because we see in press daily reports of some man who has proven untrue to his trust or some scandal involving a woman's fair name, we are not convinced that there is no longer honor among men nor virtue in women, simply because we know that the honest man and woman rarely get their names in the paper except possibly in the society column—for some charity—or an auto accident. So I say to you, there are honest public utility companies—many of them, who are striving to give the public as well as their stock and bond holders a square deal.

I will grant without question that the subject of educating the public to some of the apparently insurmountable difficulties of utility management has been sadly neglected and that carping critics have been allowed to go unanswered, thereby creating the impression that there was no answer.

Personally, I am an advocate of the creation of a public utilities publicity bureau which, operating entirely in the open, would make it its duty to defend unjust charges against the different utilities. In my last eighteen months' experience as an official of a public utility I have been more impressed than ever before (although my entire commercial experience has been such as to bring me in close touch with the activities of electric power properties and their policies) with the fact that the utilities companies, almost without exception, have been endeavoring to do that which was right at all times.

However, to get down to brass tacks, so to speak, and say to you how you can co-operate and assist the central station industry now, thereby assisting to stimulate the electrical business.

The utilities companies seek the good will of those they serve and the people at large. Their efforts to secure this result are continually combatted by ill-informed agitators and others who, for generally selfish reasons, continue to circulate statements misleading and unjust. You will meet this kind of person and those whose ideas have been molded by such general statements of condemnation as it seems usual for the demagogue to voice. My advice to you as one interested is "not to let them get away with it."

For example, if a casual acquaintance or customer should state as his belief that his electric, gas or water meter was running fast and that his serving company knew it, what would be your attitude? Would you ignore the remark and thus allow such an impression to continue in his mind, or would you, with the advantage of your technical knowledge, take the opportunity to explain the utter impossibility of this condition knowingly continuing, advising of the time, money and energy that the utilities put forth to be sure their measuring devices are correct, and the further simple fact that the manager of a utility company who would deliberately go about speeding up meters would have to have from 10 to 500 partners in crime, depending on the size of his plant. Even a crook would choke on such a condition.

In the event that a drastic underground ordinance was presented in a city council, by which a utilities company would be forced to expend large and unwarranted sums, not to increase its business or capacity to serve, and where the increased cost of service would inevitably go back to the ratepayer, would you be complacent and let the utility company carry the burden, or would you take advantage of your standing in the community and join with them in a proper presentation of the facts?

The incident of a city council endeavoring to pass such an ordinance is now before some of the central California companies, wherein the cost to do the work, without a chance of return (except by a radical increase of rate) would be sufficient to build distribution lines in one or two sparsely settled counties and afford electric power service where some good would result.

The central station manager must of necessity guard his expenditures in plant extension, putting most of them where a reasonable return may be expected, else he will have nothing for the lean spots.

If you will give some thought to these two points and a thousand others that might be mentioned except for lack of time, and then when opportunity arises never let a chance go by to state the facts, honestly, to your friends and neighbors, you will be doing the industry that provides you with a livelihood much good. It should be obvious that you yourselves must be convinced that the utilities companies are, so to speak, "on the square," and to that end I personally would be glad at any time to take up with you, singly or collectively,anything that will affect you or your customers' welfare as far as my company's policies are concerned, and feel that you will find the same condition of mind existing with all the utility companies with which you may come in contact.

Boiled down, then, my recommendation to you as to how you can be of definite assistance in co-operating with the central stations is

Defend the industry you are interested in against unjust attack from any quarter, and keep everlastingly at it.

Remember that results are not secured by wishing for them but by going out and getting them.

As David Starr Jordan at one time aptly said:

"Only that becomes real or helpful to any man which has cost the sweat of his brow—the effort of his brain or the anguish of his soul—He who would be wise must daily earn his wisdom."

So with co-operative effort. Nothing will come to pass unless we make it. I am sure the central stations will do their share and appreciate and reciprocate anything tangible which you do.

NEWS NOTES

INCORPORATIONS.

SEATTLE, WASH.—Patent rights have been issued to P. J. Healy on a water tubular locomotive boiler constructed entirely of tubes. For the purpose of manufacturing, selling and installing this boiler a company has been organized under the laws of the state of Washington to be known as the Healy Boiler Company of the United States of America, with head offices here. Capitalization is $15,000,000. The officers of the company are, F. A. Belyon, president; F. J. Healy, vice-president; and W. R. Houghtling, secretary and treasurer.

SANTA FE, N. M.—Attorney Francis E. Wilson has filed articles of incorporation of the Rio Grande Light, Heat & Power Co., with headquarters in Santa Fe, and capitalization of $1,000,000, for the development of power from the waste water in White Rock canyon. The incorporators are Daniel L. Evans, Pottstown, Pa.; Chas. L. Wilfong, Haddon Heights, N. J., and James Morrison of Baltimore; F. C. Wilson, statutory agent. The power plant is to be erected on Sandoval side of the canyon, just above Cochiti.

SALMON CITY.—IDAHO.—Articles of incorporation have been filed by the Salmon River Light & Power Company. The officers are: President, C. L. Mackenzie; vice-president, H. H. Boomer; secretary, W. A. Monroe; treasurer, R. Irvin; general manager, E. Riggs. Arrangements have been made with the Spokane & Eastern Trust Company of Spokane to float a bond issue of $125,000. A local bank has taken $25,000 of these bonds. The Lemhi Power Company has transferred all its holdings in this county to the new organization. The new plant will be modern and complete and will furnish enough power for present and future needs. The Gilmore mines will use some of the new power, and this also will be furnished to the new gold dredge to be built near town. The building of this plant will give a great impetus to local business conditions. Contracts for the work will be let as soon as the necessary estimates have been made.

ILLUMINATION.

KELLOGG, IDAHO.—The council has ordered lights installed in the Industrial Union Park.

WALLACE, IDAHO.—J. B. Ingersoll has presented a proposition for street lighting to the council.

ANACONDA, MONT.—The council has passed an ordinance to open, pave and light Commercial avenue.

SAN JACINTO, CAL.—A. S. Dudley is trying to interest capital in a proposition to bring natural gas at Brownlands to San Jacinto.

SEATTLE, WASH.—An ordinance was introduced at the meeting of the council last Monday directing the issuance of $404,000 light and power bonds.

LOS ANGELES, CAL.—Bids will be received up to August 24th, for installing and maintaining an addition to the street lighting system in the Lankershim lighting district.

CHEHALIS, WASH.—B. F. Walling has been granted the right to construct and operate electric light lines for transmitting electric power in the roads and streets of this city.

SEATTLE, WASH.—The state public service commission has passed a decision compelling the Seattle Lighting Company to extend its gas service to the residence of Benjamin E. de Roy, West Seattle.

ESCONDIDO, CAL.—The Escondido Utilities Company has sold its light and power plant to O. E. Freeman and Frank C. Woodworth. Mr. Freeman will take over the management at once. The system will be improved by the new owners.

LOS ANGELES, CAL.—Preparations are being made for the illumination of Long Beach boulevard from Huntington Park to the ocean front. Huntington Park has already raised funds to finish its part, and also to provide electroliers along Slauson avenue west.

AUBURN, WASH.—At its regular meeting of this week, the city council granted a franchise to the Auburn Gas Company, represented by J. L. Veach of Auburn. Contracts will be let at once for a modern gas plant at a cost of between $40,000 and $60,000. The franchise limits the price of gas to $1.40 per M cu. ft.

LOS ANGELES, CAL.—Installation of a comprehensive system of incandescent lighting in the city parks is proposed to meet the requests of the Juvenile Protective Association and the police department for measures to prevent immorality in the parks. The cuoncil has called on the city electrician for an estimate of the cost of such a plan.

SALT LAKE CITY, UTAH.—The Utah Light & Railway Company granted a 50 per cent discount from its regular cooking rate to company employes effective August 1st so that hereafter its employes may enjoy a rate of 2c per kilowatt hour, subject to a 10 per cent discount for prompt payment and a minimum charge of $1.00 per month for all electrical energy used for heating and cooking purposes.

SEATTLE, WASH.—The board of public works has awarded the contract for furnishing the city with electric lamps to the Pacific Lamp & Supply Company for $80,000. The contract for 80 8 pin cross arms to the Western Electric Company, 0664.20. The contract for twenty police boxes to the Dean Electric Company, $73 each, and the contract for oil pumps for the steam electric plant to the Dean Steam Pump Company, $2655.

TRANSMISSION.

SALEM, ORE.—The Kless Electric Company has completed filings for 200 h.p. on Mill Creek, a tributary of the Grand Rende River, for supplying the Summerville Union Company.

TACOMA, WASH.—Bids are being taken for supplying material for the construction of an electric transmission line from the city limits of Tacoma to the limits of the town of Steilacoom.

WINLOCK, WASH.—The Independent Electric Company, a subsidiary of the Washington-Oregon Corporation, has completed the survey for the extension of its power line from Winlock to Toledo.

HOOD RIVER, ORE.—August Guigard has completed filings with the state engineer, Salem, for development of 2000 h.p. on Hood River for the establishment of a general electric plant to supply farmers in the vicinity.

RIDDLE, ORE.—The Oregon-California Company will construct an electric power line into Riddle and Canyonville. The estimated cost of putting the line from terminus at Fernvale through Riddle to Canyonville is $40,000.

JUNEAU, ALASKA.—The Alaska Light & Power Company has stretched cables across Gastineau channel at the narrows formed by the Gold Creek estuary, and is furnishing electric light and power to the residents of Douglas Island.

SQUAMISH, B. C.—The Pacific Great Eastern development scheme is being rapidly carried along. They are waiting for special machinery now being made that the falls on the west side of the Squamish may be utilized. This power will be used for dredge work of the harbor and river bed.

CARPINTERIA, CAL.—The Holton Electric Power Company is to make this point the center of operations for the northern part of the valley, and plans are under way for the erection of a transformer station at once. G. B. Fairbanks, constructing engineer for the company, is preparing to begin work.

SANTA BARBARA, CAL.—The supervisors have instructed the county clerk to notify all telephone, telegraph, power and other companies in this county, using wires and poles along the county road, that the board will, on September 8th pass an ordinance providing that all power wires be strung on one set of poles on one side of the road, and all non-power lines on another set of single poles on the other side.

LOS ANGELES, CAL.—The aqueduct power bureau has asked the city council for an additional loan of $2000 to carry forward work on the power project for the month. The council had previously loaned the bureau $116,000, to be repaid from the money to be derived from sale of power bonds. The finance committee is to pass upon the request for a further loan. It is also planned to begin construction on the dam which is to form the Long Lake reservoir.

LEWISTON, IDAHO.—The practicability of a dam across the Clearwater River at this point is being investigated. The committee reports that the land owners whose property would have to be used in the construction of the dam, offered the land to the city if they would grant the use of the 100 h.p. of electricity for a period of 50 years. An effort will be made to get data in such shape that the issuance of bonds for the construction of the dam here can be submitted to the voters at an early date.

SAN FRANCISCO, CAL.—U. S. District Judge Van Fleet, Acting U. S. Attorney Thomas H. B. Dechand, assistant solicitor in the Department of Agriculture, and W. B. Bosley attorney for the Pacific Gas & Electric Company, left for the mountains last week to take a view of the land involved in the suit of the company against Secretary of Agriculture Houston. A motion to dismiss the action made by the government is pending before Judge Van Fleet. The company sued for an injunction restraining the United States from interfering with a water aqueduct that runs across the Tahoe national forest for about half a mile. The aqueduct is part of the Lake Spaulding power system.

TWIN FALLS, IDAHO.—The Public Utility Commission of Idaho commenced a hearing in Idaho Falls last week to consider the three-cornered fight which is now being waged for the control of the southern Idaho power territory. The Idaho Power & Light Company and the Clear Lake Power Company are seeking to enter this territory in competition with the Great Shoshone & Twin Falls Water Power Company. Mr. P. N. Nunn, consulting engineer for the Idaho Power & Light Company, was one of the principal witnesses before the commission. He is of course in favor of competition and took up extensively the subject of heating by electricity which he pronounced a luxury rather than a necessity and advisable only pending the adoption of electricity for more profitable purposes. In this he attempted to weaken any evidence produced by the Great Shoshone Company based on the distribution of electricity for heating purposes. The Great Shoshone Company is seeking to show that the Idaho Power & Light Company is not an independent concern, that it is controlled by the Idaho Railway, Light & Traction Company of Boise, which in turn is financed by large New York banking interests. Mr. Nunn's testimany would seem to indicate that such is the case; also that there is a possibility of consolidation of all of the power interests in southern Idaho not including the Great Shoshone Company.

TRANSPORTATION.

CLOVIS, CAL.—The board of trustees has authorized the offering of another street railway franchise through the town at public sale on September 8th.

SNOHOMISH, WASH.—The Commercial Club has voted in favor of asking Interurban Railway to extend line from the Northern Pacific depot to down town district.

PORTLAND, ORE.—The Portland & Oregon City Railway Company will accept a franchise for an interurban line on the east side to connect with a new line being built from Oregon City to Portland.

DIXON, CAL.—The Sacramento Valley Electric Company has been granted permission to enter this town under a one-year franchise granted by the city trustees. A depot will be built west of First street.

MILWAUKEE, ORE.—The application of L. H. Campbell of this city for a 25 year franchise to maintain railroad tracks and operate cars, and to construct power, telephone and telegraph lines in Milwaukee as amended by the public utilities committee will come up before the city council shortly.

SAN FRANCISCO, CAL.—The Van Ness avenue municipal railway line was completed by Mahoney Bros. within the time limit entitling them to the $15,000 bonus offered by the city. On August 15th an informal opening of the new municipal line will take place, cars being run from Market street to the Exposition grounds.

SPOKANE, WASH.—Judge Bruce Blake is hearing arguments of the attorneys of the Spokane Inland Empire system and the state public service commission in the case started by the commission in an effort to force the company to file a schedule of its power rates. The company seeks to prove that the sale of power to consumers is a private transaction and that it is a purchaser of power from the Washington Water Power Company.

BENICIA, CAL.—Engineers for the Benicia Land & Terminal Company have started surveying for the proposed electric railroad between Benicia and Vallejo. The outfit is in charge of Chief Engineer Matthews. President A. D. Bowen and Wm. Sanford of San Francisco have been here making arrangements. The franchise over streets in Benicia and Vallejo will probably be asked for in the near future, but action upon a county franchise must wait upon the surveys.

SAN FRANCISCO, CAL.—Action on the construction of the Church street municipal street railway has been deferred indefinitely by the supervisors on advice of City Engineer O'Shaughnessy, who argues that the proposed railway should be constructed as a unit when the entire route could be determined, and not before. Supervisor Power's motion called for immediate building of the road from Van Ness avenue by way of Market and Church streets, to the hill at 18th street, leaving the determination of the route from that point to Twenty-second and Church streets for the future.

SACRAMENTO, CAL.—Arrangement has been made by the Northern Electric Railway Co. with the Santa Fe to handle transcontinental business from all points served by the electric company in the Sacramento Valley. The routing of this business will be: Northern Electric to Sacramento; Oakland, Antioch & Eastern at Bay Point and Santa Fe beyond or Northern Electric to Sacramento, Central Traction Company to Stockton and Santa Fe beyond. In addition to the above the Northern Electric is now arranging for joint rates in connection with these roads on interstate business. The Northern Electric has previously arranged to handle transcontinental business in connection with the Southern Pacific Company and the Western Pacific Company.

VANCOUVER, B. C.—As it is probable that a number of the employes of the transportation department of the B. C. Electric will be called upon for service in the army or navy, the company has decided to do everything in its power to enable the men to perform military service as may be required without disadvantage to their connections with the company. A notice will be posted by the transportation department stating that where men apply for leave of absence to enter service during the war now in progress, the company will, as far as possible, keep their places open for them and arrange that their absence shall not disturb their seniority rights. One of the transportation employes has already made application for leave of absence to engage in military service and in considering this case it was decided to adopt the general rule above noted.